



# Installation Manual

Software Version 16.3  
Part Number: DMER201-G  
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Manual by: Owen P Walker  
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# TABLE OF CONTENTS

<b>IMPORTANT NOTICE .....</b>	<b>2</b>	3.6 Internal and External SCSI Devices.....	21
<b>CERTIFICATES &amp; COMPLIANCES .....</b>	<b>5</b>	<b>SECTION 4 - SYSTEM CONFIGURATION .....</b>	<b>22</b>
<b>SAFETY SYMBOLS .....</b>	<b>6</b>	4.1 Introduction.....	22
<b>MAINS PLUGS &amp; MAINS POWER CORDS.....</b>	<b>7</b>	4.2 Switching on the Equipment .....	22
<b>OBTAINING TECHNICAL SUPPORT .....</b>	<b>8</b>	4.2.1 Console .....	22
<b>SECTION 1 - INTRODUCTION .....</b>	<b>9</b>	4.2.2 Engine .....	22
1.1 Product Description .....	9	4.3 Boot up screen .....	24
1.2 Manual Summary .....	9	4.4 Software Installation .....	26
1.3 System Overview .....	10	4.4.1 Installing Software From .....	26
1.4 Unpacking.....	11	Exabyte .....	26
1.5 Equipment Supplied .....	11	<b>SECTION 5 - CONFIGURING DISK DRIVES .....</b>	<b>28</b>
1.6 Static Precautions .....	12	5.1 External Hard Disk Drives .....	28
1.7 Environment.....	12	5.1.1 Wide Based Disk Drives .....	28
<b>SECTION 2 - ENGINE PHYSICAL INSTALLATION .....</b>	<b>13</b>	5.1.2 Narrow Based Disk Drives .....	28
2.1 Mechanical Installation .....	13	5.1.2 Configuring The Engine For .....	29
2.2 Electrical Installation .....	14	Narrow Use .....	29
2.3 Engine Rear Panel Connections .....	15	5.1.3 Mixing Wide And Narrow Disk.....	30
2.4 Cabling .....	16	Drives .....	30
2.5 External Cable Length Considerations	17	5.2 Checking for Newly Installed SCSI .....	31
2.5.1 MERLIN CONTROL CABLE.....	17	Devices .....	31
2.5.2 SONY 9-PIN CABLE .....	17	5.3 Setting Up Removable Media.....	31
2.5.3 VGA CABLE .....	17	Devices .....	31
2.5.4 AUDIO CABLE .....	17	<b>SECTION 6 - ROUTINE MAINTENANCE .....</b>	<b>32</b>
2.5.6 DIGITAL AUDIO CABLES .....	17	6.1 Cleaning The Exterior Of The Units.....	32
2.6 Connecting The Various System .....	18	6.2 Cleaning The Monitor Screens .....	32
Components .....	18	6.3 Cleaning The Engine Air Filter .....	32
<b>SECTION 3 - MERLIN CONSOLE PHYSICAL INSTALLATION</b>	<b>19</b>	New Air Filters .....	33
3.1 Introduction.....	19	<b>APPENDIX - CONNECTION SPECIFICATIONS .....</b>	<b>34</b>
3.2 Mechanical Installation .....	19	Introduction.....	34
3.3 Electrical Installation .....	20	A1 - Audio I/O Configuration .....	34
3.3.1 MERLIN CONTROL CABLE.....	20	QDC Configuration.....	35
3.4 Interconnecting The Console And .....	20	A1.1 Analog Audio I/O Specifications .....	36
Engine.....	20	A1.2 Digital Audio I/O Specifications .....	36
		<b>APPENDIX - CONNECTION &amp; SIGNAL.....</b>	
		<b>SPECIFICATIONS .....</b>	<b>51</b>
		A2 Control & Reference Pinouts .....	51

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A3 General Purpose Interface .....	52
A4 Mixer .....	53
A5 Controller .....	54
A6 Printer .....	55
A8 9-Pin A .....	56
A9 9-Pin B .....	56
A10 9-Pin Slave .....	57
A11 LTC - I/O .....	57
A12 Serial Port .....	58
A13 Midi I/O .....	58
A14 AES Sync I/O .....	59
A15 Modem .....	59
A16 VGA .....	60
A17 Video Sync - In .....	60
A18 Word Clock - In .....	60
A19 Word Clock - Out .....	60
A20 Dimensions .....	61
A20.1 Engine .....	61
A20.1 Power Requirments .....	62
A20.2 Merlin Console .....	62

## CERTIFICATES & COMPLIANCES

### CC EMISSION CONTROL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

The Merlin Console and Engine conform to the EMC directives :-

EN 55022:1998 Class A - Emissions

EN 55024:1998 Class 3 - Susceptibility

The Merlin Console and Engine also conform to the Safety directives :-

UL 1419 - Professional Video & Audio Equipment

IEC 60950 - Information Technology Equipment

For further information on EMC procedures please refer to the following titles:-

Noise Reduction Techniques In Electronic Systems by Henry W Ott

EMC by Tim Williams

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Fairlight ESP can affect emission compliance and could void the user's authority to operate this equipment.

CHARACTERISTICS	DESCRIPTION
Equipment Type	Supplemented Data: Information Technology
Equipment Class	Supplmental Data: Class 1 - Grounded equipment
Installation Catergyory	Requirment Category 2 - Local level appliances, portable equipment etc.
Pollution Degree	Requirment: Level 2 operating enviornment - Normally only non-conductive pollution occurs. Occasionally there may be a temporary conductivity caused by condensation.

## SAFETY SYMBOLS

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated “dangerous voltage” within the product’s enclosure; that may be of sufficient magnitude to constitute a risk of electric shock to persons.

L’éclair, dans une triangle, est destiné à alerter l’utilisateur de la présence de haute tension dangereuse non isolée dans l’enclosure du produit, qui peut être d’un voltage suffisant pour constituer un risque d’électrocution.



Das dreieckige Schild mit Blitzsymbol soll den Benutzer vor unisolierten Hochspannungen innerhalb des Gerätes warnen. Es besteht Lebensgefahr durch elektrischen Schlag!

El símbolo del rayo dentro de un triángulo equilátero, es usado para indicar la presencia de un voltage peligroso en el interior del aparato, de suficiente intensidad, como para constituir riesgo de electrocución a las personas.

“三角形内加上闪电似的箭号”表示机件 / 机器内部有“暴露的高电压”，可能造成触电的危险。

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the appliance.

Le point d’exclamation dans une triangle est destiné à alerter l’utilisateur de la présence d’instructions importantes de fonctionnement et d’entretien dans la littérature accompagnant l’appareil.



Das dreieckige Schild mit Ausrufungszeichen soll den Benutzer auf wichtige Bedienungs- und Wartungshinweise in der Bedienungsanleitung hinweisen.

El símbolo de exclamación dentro de un triángulo equilátero avisa al usuario de la presencia de instrucciones importantes acerca del funcionamiento y mantención del aparato en los documentos que se

“三角形内加上感叹号”表示提醒使用者查阅附上的“重要操作和维修指南”。

## MAINS PLUGS & MAINS POWER CORDS

The following lists the recommended Mains Plugs and Leads for use in various countries throughout the world.

<b>Mains Attachment Plugs</b>		
<b>Standards applicable for Mains Plugs</b>	<b>Rating</b>	<b>Country</b>
ASTA BS1363 1984	10A @ 250VAC	UK
BS546, 1950	10A @ 250VAC	India, Kenya, Nigeria, Kuwait, Parts of Asia and the Far East
IEC695-2-1 & NF-USE	10A @ 250VAC	France & Belgium
DIN49441 & CEE 7 Sheet VII	10A @ 250VAC	Europe
SEV	10A @ 250VAC	Switzerland
CEI23-16	10A @ 250VAC	Italy
NEMA5-15P & NEMA6-15P	10A @ 250VAC	USA
<b>Mains Power Leads</b>		
<b>Standards applicable for Mains Leads</b>	<b>Rating</b>	<b>Country</b>
CSA22.2 No.42 & UL498	10A @ 250VAC	Canada & Japan
ASE 1011 (1959)	10A @ 250VAC	Switzerland
CEI 2316	10A @ 250VAC	Italy
SRAF 1962	10A @ 250VAC	Denmark
AS3112-1990, NZSS198-1967	10A @ 250VAC	Australia, New Zealand, Fiji, Papua New Guinea, Republic of China
UL498 & SJT 10A minimum rating with IEC60320-1 coupler	10A @ 250VAC	USA

## OBTAINING TECHNICAL SUPPORT

Users requiring technical support should contact their local Fairlight office or distributor.

Information can also be found on the world wide web at :-

<http://www.fairlightesp.com.au>

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## SECTION 1 - INTRODUCTION

### 1.1 PRODUCT DESCRIPTION

Merlin is the first of a new generation of disk based multitrack recorders from Fairlight. The system marries together an advanced user interface with the technology of the latest generation of digital audio workstation in a combination that has a significant impact on productivity and efficiency.

The Merlin interface incorporates a dedicated editing Console with a unique graphical user interface. These tools allow the operator to work quickly and efficiently without impeding the creativity of the recording and editing process, and can now be fully utilized in the professional audio suite. The Merlin offers a number of unique benefits through its adaptation of DSP and proprietary technology to the audio environment.

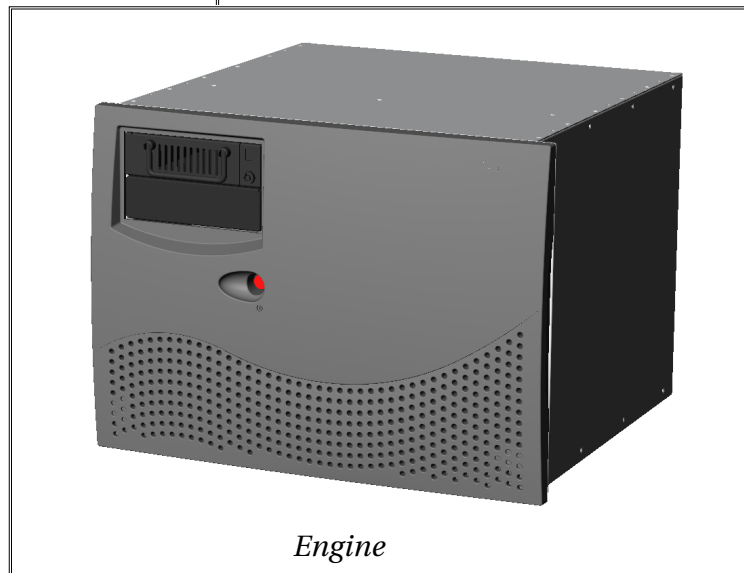
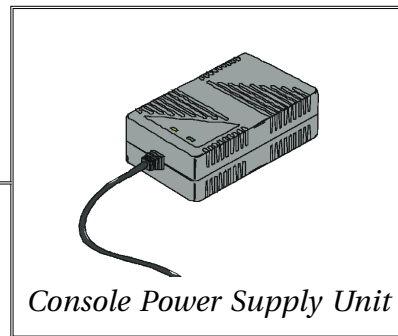
For a more detailed explanation of the Merlin, please refer to the *Merlin User Manual*.

### 1.2 MANUAL SUMMARY

The purpose of this manual is to provide all the technical information required to design a suitable installation for the Merlin system and to fit and connect the units. It is assumed that the installer is familiar with both analog and digital audio signals. For full operational instructions please refer to the *Merlin User Manual*.

### 1.3 SYSTEM OVERVIEW

The Merlin is made up of four interconnecting components, the Merlin Console and external power supply, a Flat Screen Display Monitor and a Engine rack mounted unit which contains all the electronic circuitry, disk drives and audio I/O necessary to run the system.



## 1.4 UNPACKING

It is advisable that before any installation work is attempted that the system be unpacked and the contents verified. A sizeable area approximately 3 meters square should be suitable. Using the basic packing list attached record the items you have received. This will both help you when you have to make an enquiry, by having the relevant details logged in your Installation Manual, in the event of a packing omission. At this stage do not power up the system, nor remove electronic modules from the system, as damage may occur if not handled correctly.

## 1.5 EQUIPMENT SUPPLIED

EQUIPMENT SUPPLIED	QUANTITY	CHECK LIST
Engine	1	
Merlin Console	1	
Merlin External Power Supply Unit	1	
Mouse	1	
Merlin Installation Manual	1	
Merlin User Manual	1	
Merlin Console Controller Cable	1	
Keyboard	1	

## 1.6 STATIC PRECAUTIONS

Please take note that all Fairlight manufactured electronic modules are static sensitive and should be handled under anti static conditions. When working on a system always ensure that you have an anti static lead connected and that the system is connected to ground through an earth lead.

Never work on the system while powered up unless you are authorized by Fairlight to do so. As a matter of practice always touch the external chassis of the system before opening the front panel. If cards are not handled under anti static procedures your machine may sustain damage which could either cause a complete failure or may cause intermittent crashes and subsequential system failure.

When handling cards please ensure that they are placed in anti static bags when not in the system. For shipment purposes electronic modules should be placed in an anti static bag and then suitably surrounded with loose packaging materials in a solid card board box. Cards shipped to Fairlight without the correct anti static packaging will have their warranty voided. If you have any enquiries on this matter please feel free to contact your local Fairlight office or distributor.

## 1.7 ENVIRONMENT

The system is designed to be operated in a clean air-conditioned environment. Generally, an area comfortable for people ( 20°C - 21°C ) should be suitable. The rack mounted units and disk drives, use fans for ventilation. Users may find it desirable to install these units away from the operator/console location. Note that cable lengths, as detailed in *Section 2.5 - External Cable Length Considerations*, should be taken into account when planning the installation.

Make sure that the rack units can access cool air through the opening on the front of the Engine and expel warm air from the back. As with all computer systems, the Fairlight will operate more reliably if static generating floor coverings are avoided.

Do not fit the Engine into a closed environment except where ducted cool air is forced through the Rack. Do not run the Engine whilst it is on the ground as it will accumulate dust, which may eventually cause a failure.

The Engine unit is normally installed in a suitable 19" rack which is at least 600 mm deep, or has an open back section. It is recommended that external hard drives be mounted on a rack tray, above or below the Engine, using the shortest possible cables to prevent SCSI bus corruption.

Please Avoid:

- Fitting the Engine where air circulation will be restricted.
- Installing Engine close to heat sources.
- Installing in dusty or damp area.
- Installing in area subject to vibration.
- Installing in area with strong magnetic or electric fields

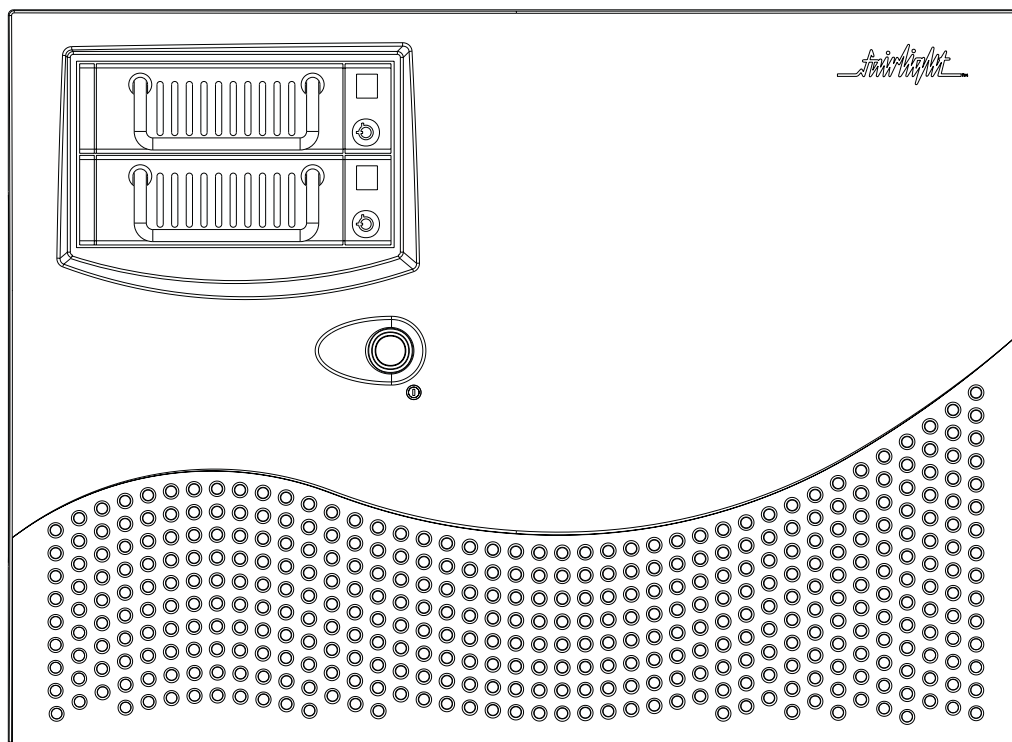
## SECTION 2 - ENGINE PHYSICAL INSTALLATION

### 2.1 MECHANICAL INSTALLATION

The Engine unit, takes up 8 RU, when fitted into a 19" rack. It operates from either 100-120v or 200-250v, 50-60Hz with the mains inputs being auto-switching, as such there are no switches to be set. At least two people are required to fit the Engine into a 19" rack as the unit is quite heavy. If available it is suggested that a third person be made available for the initial installation into the rack, such that a person can guide the Engine into the rack, from the rear.

The Engine should be fitted so that there is no restrictions to the ventilation, at the rear of the unit. If external SCSI devices are to be connected it is recommended that these be placed on a rack tray above or below the Engine.

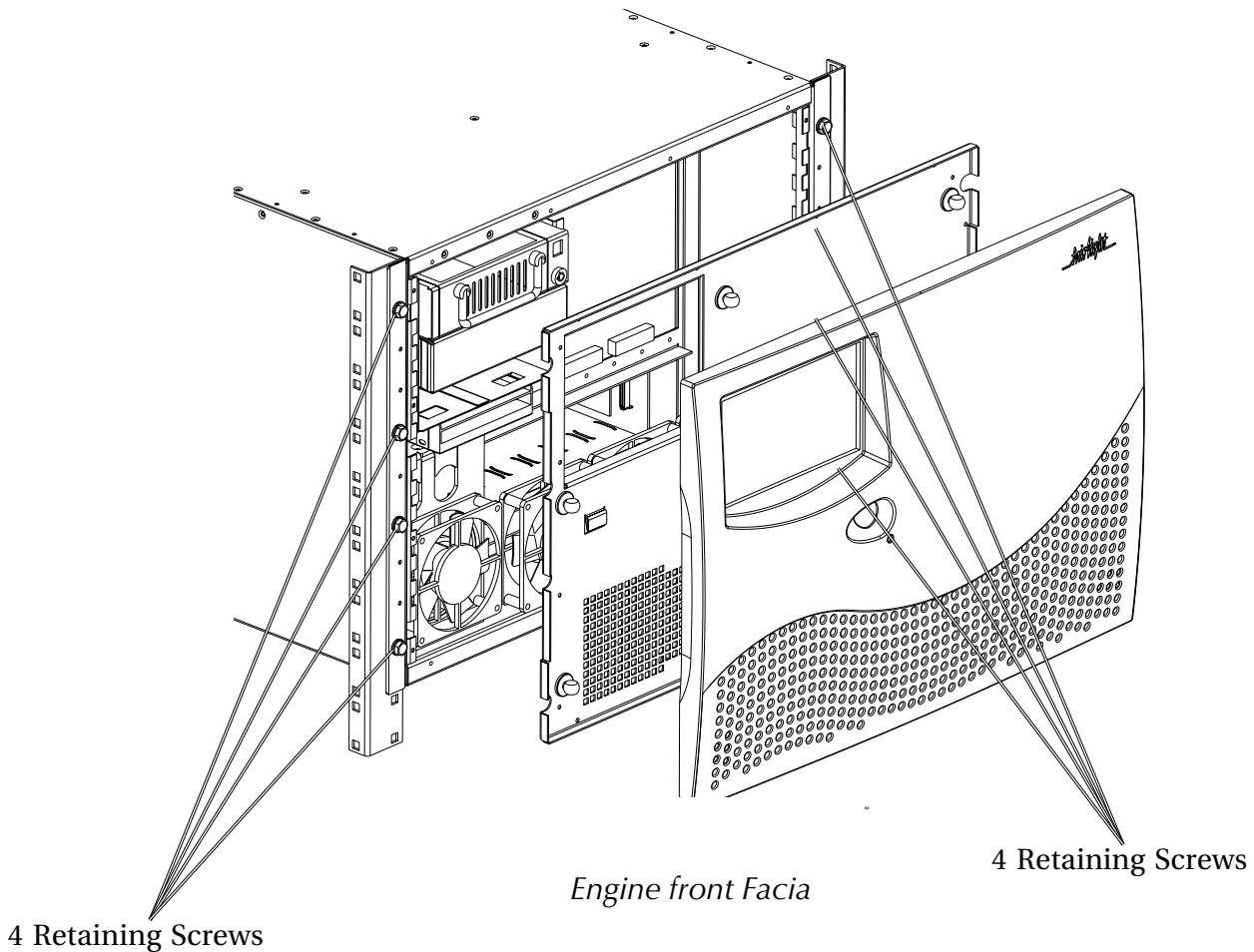
It should be noted that typically the Engine unit is fitted with a boot drive with SCSI I.D. " 0 "( although the boot drive can be at any ID ). The Engine uses fans for its forced ventilation system, these generate an amount of ambient noise. As stated before the Engine should be located in an air conditioned machine room away from the studio and other heat generating equipment.



*Engine Front Panel*

1 Install the Engine into a 19" Rack unit. Once this is done, the front fascia of the Engine must be removed to allow 8 retaining screws to be fitted.

2 To mount the Engine into the rack, remove the front dress panel and insert 4 retaining screws on to both the left and right rack mounts. Once this is done reattach the front dress panel.



## 2.2 ELECTRICAL INSTALLATION

The Engine is designed to run from a single phase power source with one of its current carrying conductors at or near ground earth ground potential ( the neutral conductor). Only the line (live) conductor is fused for over-current protection. Systems that have both current carrying conductors live with respect to ground , such as phase-to-phase in multi-phase systems are not recommended as power sources.

It is recommended that both the Engine and Console are connected to the same electrical supply or ring main which ideally should be regulated and smoothed. If the power source is likely to be unexpectedly cut then both the units should be fed from a backed up power source such as a UPS.

For Power Requirements, see Appendix A21 at the back of this Manual.

Mains connections should be fitted with the appropriate type of plug. See Section “Mains Plugs & Power Cords” at the front of this Manual.

## 2.3 ENGINE REAR PANEL CONNECTIONS

The Engine rear is split into two distinct sections; the System I/O Panel, located to the right and the Audio I/O section, located to the left.

The System I/O Panel contains all the synchronization needed to allow communication with external devices including RS-422, Midi, LTC, AES Sync, Serial and GPIO.

To allow communication with other Fairlight products including Fame and Prodigy, a Mixer port is provided.

To allow communication with the Merlin Console, a Controller port is provided.

The System I/O Panel also contains the VGA Output, Word Clock and Video sync In connectors.

The Audio I/O Section can contain up to a maximum of 4 QDC cards, which perform all analog and digital I/O Connections and Processing.

Each QDC card can contain a maximum of :-

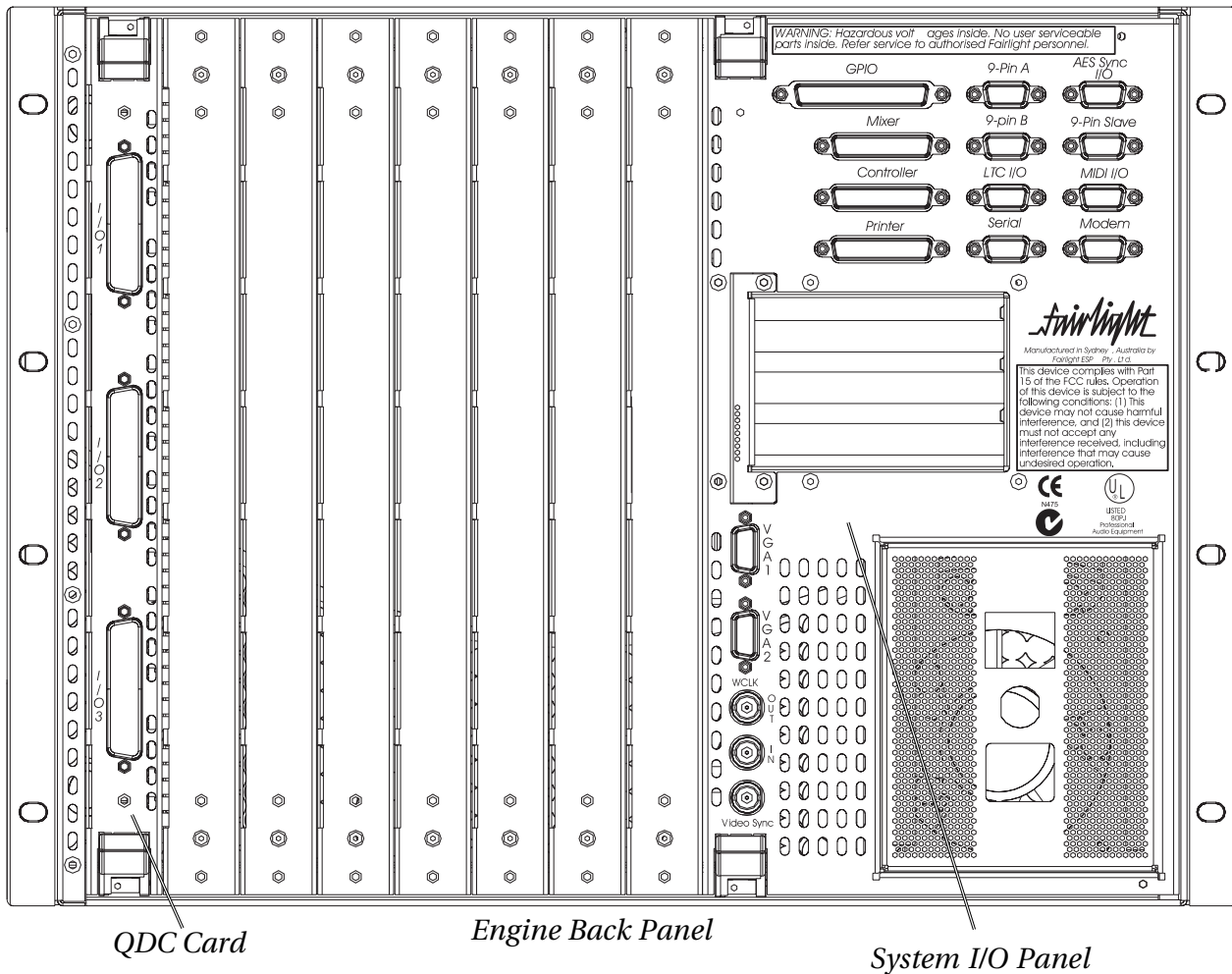
- 16 Analog Inputs and 32 Analog Outputs

or a maximum of :-

- 32 Digital Inputs and Outputs
- 16 Analog Inputs.

Depending on what configuration is ordered, the system can allow for more QDC cards to be configured. Please contact your local Fairlight office or Distributor for further information regarding the maximum inputs and outputs which can be configured within the system.

Please refer to the Appendix page 53 for further details on the Audio I/O and System I/O Panels.



## 2.4 CABLING

Once the mechanical installation of the Engine is complete, a number of cables must be connected. Some of these connect various components together and may have been supplied with the Merlin system, others provide connection to the rest of the environment.

The interconnecting cables supplied as standard may not be long enough for your installation, in which case you must provide longer cables. The following information gives specific wiring details and highlights any special requirements, however as with all equipment not supplied with the Merlin system, it is the installer's responsibility to ensure that these cables comply fully with the applicable safety and EMC regulations.



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## **2.5 EXTERNAL CABLE LENGTH CONSIDERATIONS**

Poor cabling can be the bane of a good system. Earth loops, floating inputs and outputs and extended runs are just some of the issues to be addressed when planning an installation.

### **2.5.1 MERLIN CONTROL CABLE**

The Merlin Control Cable connects the Merlin Console to the Engine. The cable carries RS232, RS422 and MIDI signals and is limited to a maximum length of 30 meters, providing correct attention is paid to signal pairing using twisted pair cable. Ensure sufficient slack is left at the Console end to ensure movement of the Console does not cause undue stress on the connector, or cause the connector to partially disconnect, which can damage the serial drivers. When fitting or reconnecting the cable ensure that power is off at either the Engine or the Console.

### **2.5.2 SONY 9-PIN CABLE**

The 9-Pin cable connects the Engine to a Sony 9-pin protocol machine. The recommended maximum length for this cable is 30 meters. Again it is recommended that the power be switched off at one end when connecting to protect the drivers.

### **2.5.3 VGA CABLE**

The Video cable connects the VGA output from the Engine to the attached Monitor. It is a 15-way shielded 50 Ohm cable with high density D-type connectors at each end. A maximum length of 20 meters is typical.

### **2.5.4 AUDIO CABLE**

Standard shielded audio cable is suitable.

### **2.5.6 DIGITAL AUDIO CABLES**

Digital cables connected to the Engine system must be of the correct 110 Ohm impedance.

---

## 2.6 CONNECTING THE VARIOUS SYSTEM COMPONENTS

- 1 Once cabling issues have been dealt with the various system connections need to be made.
- 2 Connect an IEC Power lead to the back of the Engine.
- 3 Connect the 15 way D connector of a Video cable to VGA 1 connector on the System I/O Panel on the rear of the Engine.
- 4 Connect the Console Controller cable to the connector on the System I/O panel located on the rear of the Engine.
- 5 Connect any external SCSI drives to the external SCSI card (if fitted) and ensure that the last device is terminated. Ensure that the SCSI I.D.'s are not in conflict with each other.
- 6 Connect all Synchronization cables such as LTC, Word clock, Video Black burst etc.
- 7 Connect all audio input and output cables to the QDC cards located on the rear of the Engine.

## SECTION 3 - MERLIN CONSOLE PHYSICAL INSTALLATION

### 3.1 INTRODUCTION

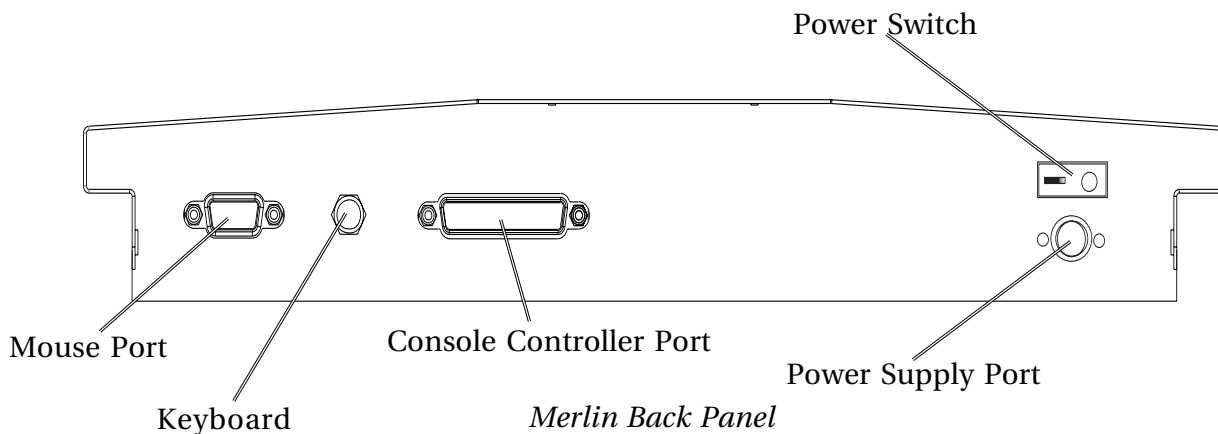
The Merlin Console provides a control surface to allow the engineer to work quickly and efficiently. The Console has a number of user definable macros and keystrokes. For more information regarding the operational use of the console please refer to the *Merlin User manual*.



*Merlin Console*

### 3.2 MECHANICAL INSTALLATION

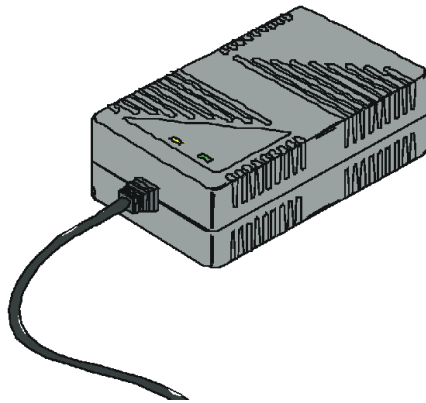
The Merlin Console should be sat on a level horizontal surface.



### 3.3 ELECTRICAL INSTALLATION

The Power Supply unit is an auto ranging unit which will take any input voltage from 100 to 250VAC using a standard IEC mains cable. As there are no mains switches on the power supply it should be plugged into a switched mains outlet. The output from the PSU is 12DV, fed to the console via an 8 pin mini DIN connector. As the output lead is fairly short, the PSU should be located close to the console.

A small LED indicator illuminates when the supply is on.



CAUTION : 1. DO NOT USE ANY OTHER POWER SUPPLY TO POWER THE CONSOLE.  
2. DO NOT CONNECT THE POWER SUPPLY TO THE CONSOLE WITH THE MAINS POWER TURNED ON.

#### 3.3.1 MERLIN CONTROL CABLE

The Merlin Control Cable connects the Merlin Console to the Engine unit. The cable carries RS232, RS422 and MIDI signals and is limited to a maximum length of 30 meters, providing correct attention is paid to signal pairing using twisted pair cable. Ensure sufficient slack is left at the Console end to ensure movement of the Console, does not cause undue stress on the connector, or cause the connector to partially disconnect, which can damage the serial drivers. When fitting or reconnecting the cable ensure that power is off at either the Engine or the Console.

### 3.4 INTERCONNECTING THE CONSOLE AND ENGINE

- 1 Place the Console at a suitable location close to the mixing desk.
- 2 Connect the Console Controller cable to the 37 Pin D connector on the rear of the Console.
- 3 Connect the mouse to the 9 Pin D connector on the rear of the Console.
- 4 Connect the Console power supply cable to the Merlin Console and then connect the mains power to the Merlin Console power supply unit.
- 5 Connect the Keyboard cable to the Keyboard socket on the back of the Merlin Console.
- 6 Once all connections have been made to the Console, it can be powered up safely, by pressing the switch located on the back panel.

### 3.6 INTERNAL AND EXTERNAL SCSI DEVICES

The Engine unit has been designed to accept two 3.5 Inch drives and 2 5.5" drive bays internally which can take either Kingston Technology drive enclosures or an Exabyte enclosure. The system typically comes configured with one system disk which contains the O/S9 Operating System and Merlin software. This allows for 3 media drives to be fitted internally in the system.

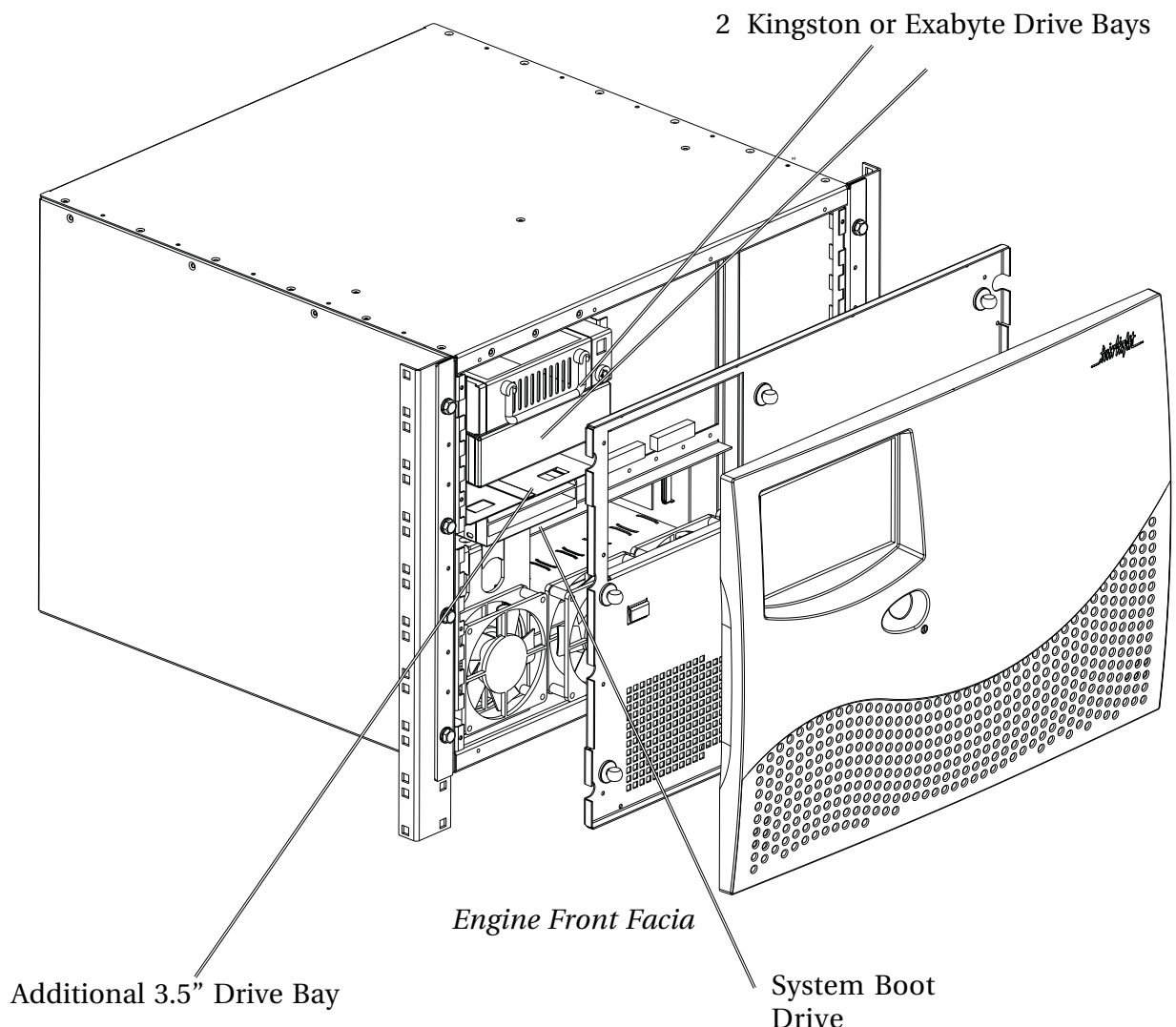
With a second SCSI Controller installed within the Engine an additional 7 SCSI devices can be attached externally.

Typically Exabyte drives should be set to ID "5" when connected on either SCSI Buss.

Optical based devices should be set to ID "3". When connected on either SCSI bus.

It is recommended that a rack tray be fitted either above or below the Engine to hold external SCSI devices. The last device on the chain should be terminated with all other devices being looped through. The cables should be the shortest length possible to avoid SCSI bus corruption.

See Section 5 - *Configuring Disk Drives*



## SECTION 4 - SYSTEM CONFIGURATION

### 4.1 INTRODUCTION

The following describes the procedure for powering on the Console and Engine.

**CAUTION : NEVER ATTEMPT TO ATTACH SCSI BASED DISK DRIVES OR OTHER CABLING WHILE THE SYSTEM IS RUNNING AS THIS MAY CAUSE FILE CORRUPTION. ALWAYS POWER OFF BEFORE CONFIGURING ANY CABLES.**

### 4.2 SWITCHING ON THE EQUIPMENT

#### 4.2.1 CONSOLE

Once the mouse and cables have been connected, the Merlin Console can be powered up.

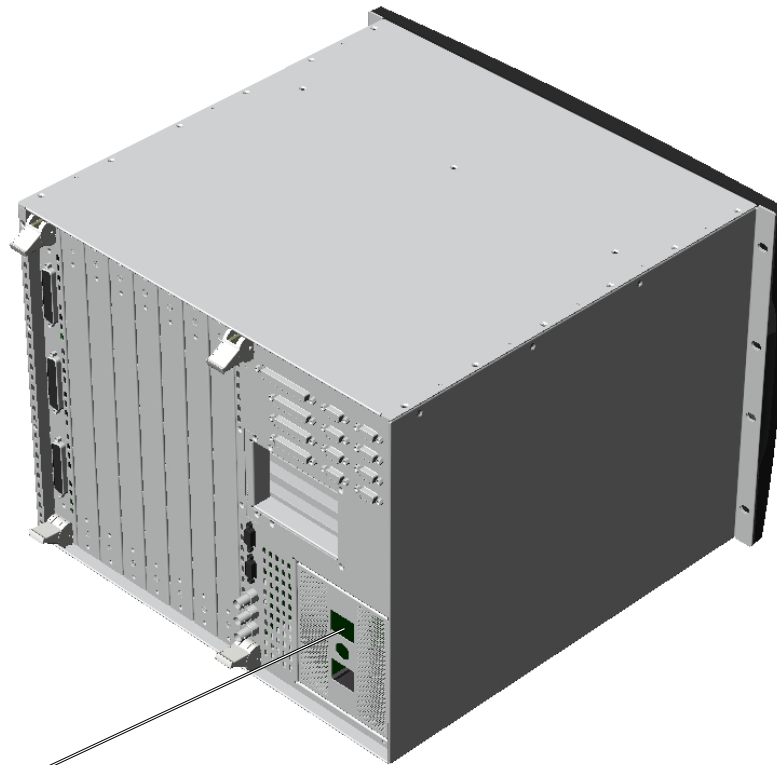
1. Turn on the power switch, at the power source, and on the back of the Console. The Console will then boot up.

2. The green LC display on the Console should display zero's on the top screen and on the lower screen the software revision.

#### 4.2.2 ENGINE

1. Ensure all SCSI cables and terminators are connected.
2. Power up all SCSI devices.
3. Verify monitor cable is connected and then power up the monitor.
4. Ensure all Sync Input/Output cables are connected and secure.
5. Turn down the master faders on the mixing console.
6. Ensure all digital and analog Input / Output cables are connected and secure.
7. Ensure Merlin Console cable is connected and secure.
8. Ensure 9 pin control cable is connected and secure.
9. Power up the Engine via the switch on the back panel then press the switch on the front panel.
10. Power up the Merlin Console, if not already powered up.

At this point the system should be booting up if all has gone to plan. Initially you will observe a gray and blue text screen, containing system configuration information. The system will continue booting until the program is loaded.



Back Panel Power Switch

*Engine Back Panel*



Front Panel Power Switch

*Engine Front Panel*

## 4.3 BOOT UP SCREEN

At this point the system should be booting up and the following text should be seen on the graphical interface.

1. Take note of the SCSI devices being found in case a problem is encountered.

```

+-----[ Fairlight ESP - MFX Mainframe - Flashware v1.00 [16.1.07b] ]-----+
|                                     Backplane: Yes (9)          Compile Date: Feb 21 2000|
|                                     SIO [1]: No              Compile Time: 12:05:16  |
|                                     SIO [2]: No              IntGlue Xilinx: 34    |
|      Colour Graphics Card [A]: No          TSB Xilinx: 7        |
|      Colour Graphics Card [B]: No          Machine ID: 061C207A  |
+-----[ Non Volatile RAM Options ]-----+
|      SCSI Controller Boot Slot: 0          ROM Debug Level: OFF |
|      SCSI Initiator ID: 7                 IOPACK Mode: 46 Lines|
|      Synchronous SCSI: Yes               |
|      Disconnecting SCSI: Yes             |
|      Wide SCSI: Yes                      |
+-----[ DIP Switch Settings ]-----+
|      Enable System Debugger #A1: No       Boot ROM Select (0) #B1: No
|      Disable PCI BIOS #A2: No            Boot ROM Select (1) #B2: No
|      Disable MMU #A3: No                 HIRE5 CG5 Enable #B3: No
|      Disable IOPACK Output #A4: Yes      DipSwitch #B4: No
|      Change CCB to CWT #A5: No          DipSwitch #B5: No
|      QDC Disable #A6: No                 DipSwitch #B6: No
|      QDC Order left->right #A7: No      DipSwitch #B7: No
|      DipSwitch #A8: No                   DipSwitch #B8: No
+-----[ PCI Buss Status ]-----+
|      On Board SCSI: Installed   Symbios 53c875 [1000:000F:#91]
|      Slot #1: Vacant
|      Slot #2: Vacant
|      Slot #3: Installed   Intel i82557 [8086:1229:#90]
+-----+
OS-9/68040 System Bootstrap [Dynamic RAM Version]

Press Key to Display Boot Menu ... 4 3 2 1 Autobooting

Scanning On Board PCI SCSI Controller
ID -   DEVICE TYPE   VENDOR   PRODUCT           FIRM CAPACITY SECT   MB
-----
01 -   Fixed Disk   IBM      DRUS09V           0270 011191F9  512  8754
-----

Attempting to Boot to Target #1 on the Onboard Controller
Detected an RBF Formatted Disk.
A valid OS-9 bootfile was found.
-nt
Setting Lines Per Page to 48 - [TERM=xterm] .....
Loading Resident Modules .....
Starting Resident Fairlight Extension Modules .....

Flight: v3.09 - Fairlight OS9 Extensions
ESP Messages Version 1.10

Initialising MMU .....
Starting RAM Resident IOPACK .....
Saving Last TUT Image (/dd/tvtlog.txt) .....
Press Any Key to Edit System Configuration ..... 4 3 2 1
Starting Network .....
Creating primary (MASTER) network interface "/ie0" for [Web]
  HOSTNAME   = mfx_232
  IP_ADDRESS = 192.100.105.232
  NET_MASK   = 255.255.0.0
  DOMAINNAME = MFX
  INNET=ffff0000 BDCST=ffffffff
Creating device descriptor "ie0" "if82557" "ifman"
Creating socket: Devices "/lo0 /ie0" for host "mfx_232"
Starting Network
Starting TUT Drivers (TCP/IP Port 2700) .....

```

2. If the Merlin system has been configured to be part of a network, check that the Engine is attaching to the network. For further details on connecting to an Local Area Network, please the network administrator.



```
Starting MFX Console .....
=====
                        System Identification
Machine #:061c0283      Site:Fairlight ESP Pty Ltd
MERLIN
9-Pin:YES
MFX
Multi-Out:YES          Printing:YES          Time-FX:YES          Audiobase:TWO
Tracks:48              A-In:48          A-Out:48             D-In-Out:48
Preview:YES            Connect:YES       MediaLink:YES
Varispeed:YES         CD-Write:YES
=====
Creating Temporary Directory (/dd/TMP) .....
Starting File Gopher, DFN Server, FFS, ANETD and NODED .....
Starting SCSI Caching Sub-System and Media Daemon .....
Initialising Audio Hardware .....
jtag v2.06:
qdcinit v3.06
Resetting all QDCs
QDC 1 Slot 7 OK
DSP Resources
  1 QDC cards
  4 DCC sections
  8 DSP processors
I/O Resources:
  2 AIN cards
  2 AOUT cards
  2 DIO cards
 16 Analog Inputs
 16 Analog Outputs
 16 Digital Inputs
 16 Digital Outputs
Checking Versions of Modules, ROMS and Hardware .....

Starting Session .....
1 devices online
OS-9/68K V3.0.3  MFX/PX-DYNAMIC '/term' online 00/25/06 at 19:04:31
User name?: mfx

Process #32 logged on    02/01/06 19:04:52
Welcome!

MFX:
```

3. As the boot up process continues check that the Merlin Console is being seen.

4. If a problem is encounter with audio I/O check that the system is logging the QDC card or cards within the system.

5. If problems persist please contact a local Fairlight office or distributor.

---

## 4.4 SOFTWARE INSTALLATION

From time to time software will need to be installed onto the Merlin system. The following describes the steps which need to be taken to install software.

### 4.4.1 INSTALLING SOFTWARE FROM EXABYTE

To update software from the Exabyte when no release files are available.

1. Ensure that an Exabyte drive is connected and set to ID 5.
2. Power up the Exabyte drive.
3. Place the Exabyte software tape in the drive.
4. Power up the Engine.
5. Press the < Space Bar > immediately on powering up the system. You may need to press the < Space Bar > a few times. The aim is to stop the system booting from a hard drive if one is connected.
6. The displayed prompt is " Select a boot method from above menu: ".
7. Type " ROM " < Return > to boot to from Rom.
8. Type " Upgrade -T " < Return>. This tells the system to boot from the Exabyte at ID 5.

Follow the procedure as appears on the screen. You will be asked if you want to reformat the drive. Answer NO to this if there are projects you require on the drive.

## SECTION 5 - CONFIGURING DISK DRIVES

### 5.1 EXTERNAL HARD DISK DRIVES

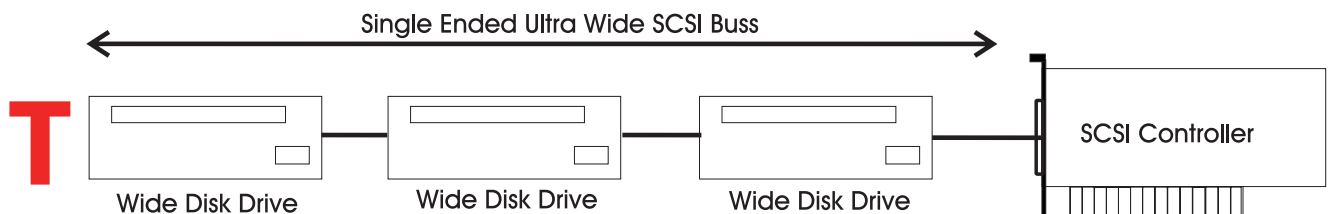
An additional SCSI controller can be added to the system and fitted in one of three PCI slots on the PXY Main Processor Board. With the controller physically installed an additional 7 SCSI devices can be connected to the system.

#### 5.1.1 WIDE BASED DISK DRIVES

The Ultra Wide single ended SCSI specification is used within the internal and external SCSI busses. This allows for ultra fast transfers speeds from a disk drive up to 40 megabytes a second.

The SCSI controller comes configured with a single ended 68 Pin configuration connector.

Only a Fairlight supplied SCSI Controller can be installed and configured with the Engine.



All cabling to SCSI devices must be kept as short as possible. The maximum length for the entire buss must not exceed more than 1.5 meters. It is highly recommended that drive enclosures with an active backplane be used to reduce cable lengths.

Some disks have SCSI terminating resistors in place and these should be checked and resistors removed when extra disks are being added to the system.

The last disk drive at the end of the chain must be terminated using an active terminator. Lower transfer rates and SCSI errors will result if the buss is not correctly terminated.

SCSI I.D.'s can be 0 through to 6. SCSI I.D. 7 is reserved for the SCSI controller.

#### 5.1.2 NARROW BASED DISK DRIVES

Narrow Based SCSI Disk Drives may be attached to the buss but must always be the last in the chain after any Wide disks are connected.

A quality 68 pin to 50 pin Adaptor must be used when connecting from the SCSI buss to a narrow disk drive.

The end of the Buss must be terminated using an active SCSI terminator plugged into the last drive in the chain.

When using narrow based disk drives along the SCSI buss the Engine must be configured for Narrow use only.

## 5.1.2 CONFIGURING THE ENGINE FOR NARROW USE

Connect disk drives to external SCSI buss port.

Power on the disk drives and Engine

When the BIOS screen appears PRESS THE SPACE BAR, before the -

“Press Key To Display Boot Menu” Countdown ends.

Under Booting Procedure press RC and press Enter .

A message should appear next on screen asking

“Do you want to use the recommendedNVRAM Configuration” PRESS N

Press C then Enter - to “Reconfigure The System Setup”

Press Return untill the cursor has moved down to the 11 th line -

Slot 1 SCSI Wide.....

At this point you will need to know which PCI slot the SCSI Controller Card has been fitted in. Looking at the Merlin Engine from the rear will show which slot the card is in -

- Slot 1 is the top most slot
- Slot 2 is the middle slot
- Slot 3 is the Bottom slot

Use the Enter key on the Console Keyboard to move down the list to the correct slot.

Next press 0 on the Console Keyboard to change from Wide to Narrow use.

Then Press Enter untill the following message appears on screen

“Enter the NVRAM Section you wish to Update”

Select Q and then press Enter.

A message will appear -

“NVRAM Configuration is complete ....System will now restart”

Press Return on the Console Keyboard.

The configuration is now complete.

### 5.1.3 MIXING WIDE AND NARROW DISK DRIVES

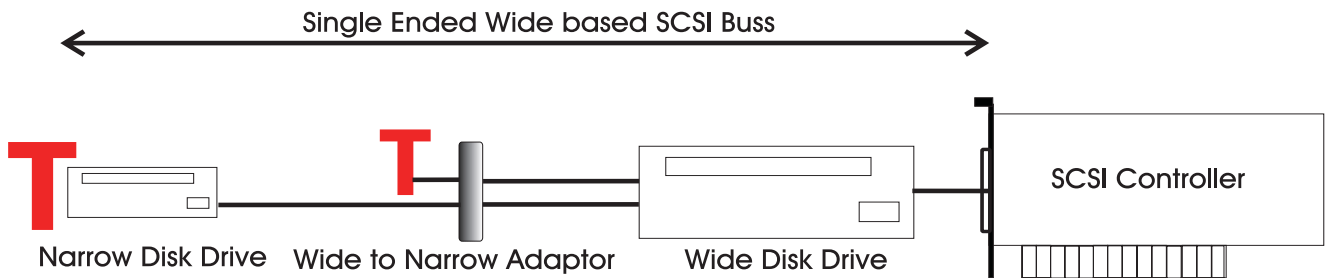
Wide and Narrow based disk drives can be mixed on the same SCSI buss at the same time -

Narrow Based SCSI Disk Drives must always be the last in the chain after any Wide disks are connected.

If the Engine is configured to run in Wide Mode, a quality 68 pin to 50 pin Adaptor must be used when connecting from the SCSI buss to a narrow disk drive.

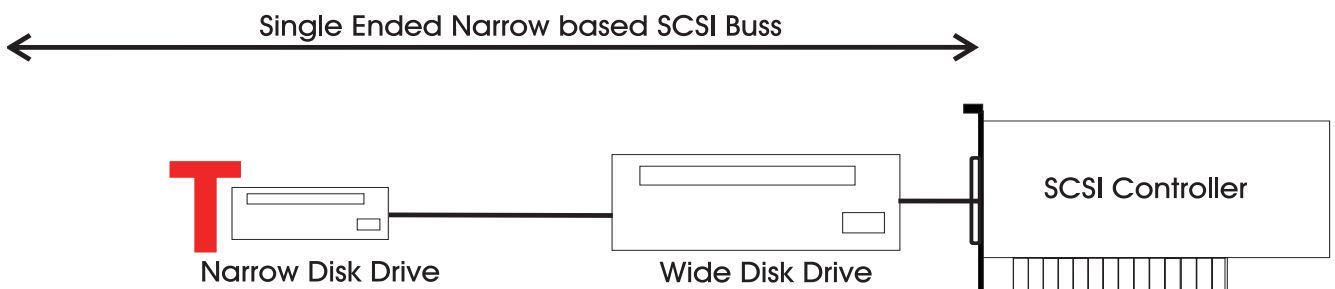
Please note the High Data Byte must be terminated when using an Adaptor, to allow for correct termination wide converting to a Narrow disk drive.

Remember to always terminate the last drive in the chain.



If the Engine is configured to run in Narrow mode, an Adaptor without High Byte termination may be used.

Remember to always terminate the last drive in the chain.



## 5.2 CHECKING FOR NEWLY INSTALLED SCSI DEVICES

Once you have mounted all external and internal SCSI devices, the following will aid you in determining if they are all detected.

1. Ensure that the Engine is completely reassembled and that there are no loose cables.
2. Power up the Engine and Console.
3. Press the SPACE BAR once a gray display is seen. If you miss the time window in which the Space bar must be pressed, simply reboot and try again.
4. The displayed prompt is " Select a boot method from the above menu: ".
5. From the prompt type " SCAN " or " DF "< RETURN >.
6. Observe that all SCSI devices are detected.
7. You may need to run this command a couple of times as some drives are much slower to boot than the Engine.
8. If a SCSI device is not seen, power down the system and check all SCSI ID's and that the SCSI and power cables are connected.

## 5.3 SETTING UP REMOVABLE MEDIA DEVICES

To set up optical drives for use on the system it is not necessary to format the media. All that is required is that the following command be run on the media;

```
DISKINIT /tdwx -w -n=name
```

(W is the PCI #, X is the SCSI ID)

This command must be run from the shell, so you will need to quit from the main application to the shell.

When media is not in use it is strongly recommended that the media is ejected from the drive to ensure that the media has not deteriorated due to the level of heat in the drive itself.

**CAUTION - KEEP MEDIA AWAY FROM STRONG MAGNETIC FIELDS AND DIRECT SUN LIGHT AS THIS CAN DAMAGE THE DISK.**

Please note - The system automatically detects new SCSI devices. For example if an Optical drive is connected at boot up and the media is not present the device will be seen on the Project page, however it will indicate no media. On placing a suitable formatted media in the drive the device will become available for use.

Hard drives will also be automatically detected if they are installed correctly.

Please avoid connecting external devices by breaking the SCSI chain while the system is running as it can either crash the system or if a project is open, lead to project corruption.

## SECTION 6 - ROUTINE MAINTENANCE

### 6.1 CLEANING THE EXTERIOR OF THE UNITS

You should clean the Merlin system units often enough to prevent dust or dirt from accumulating. Dirt acts as a thermal insulating blanket that prevents effective heat dissipation and may provide high-resistance electrical leakage paths between conductors or components in a humid environment.

Clean the dust from the outside by wiping with a soft cloth or small brush. A brush is especially useful for removing dust from around connectors and cooling grilles. Use a cloth dampened in water that contains 50% Isopropyl alcohol to remove hardened dirt. You should not use abrasive cleaners.

### 6.2 CLEANING THE MONITOR SCREENS

The Graphics Monitor has a special coating on the screen which prevents glare. A cleaning cloth should be supplied with the Graphics Monitor and the instructions given in the monitor manual should be followed.

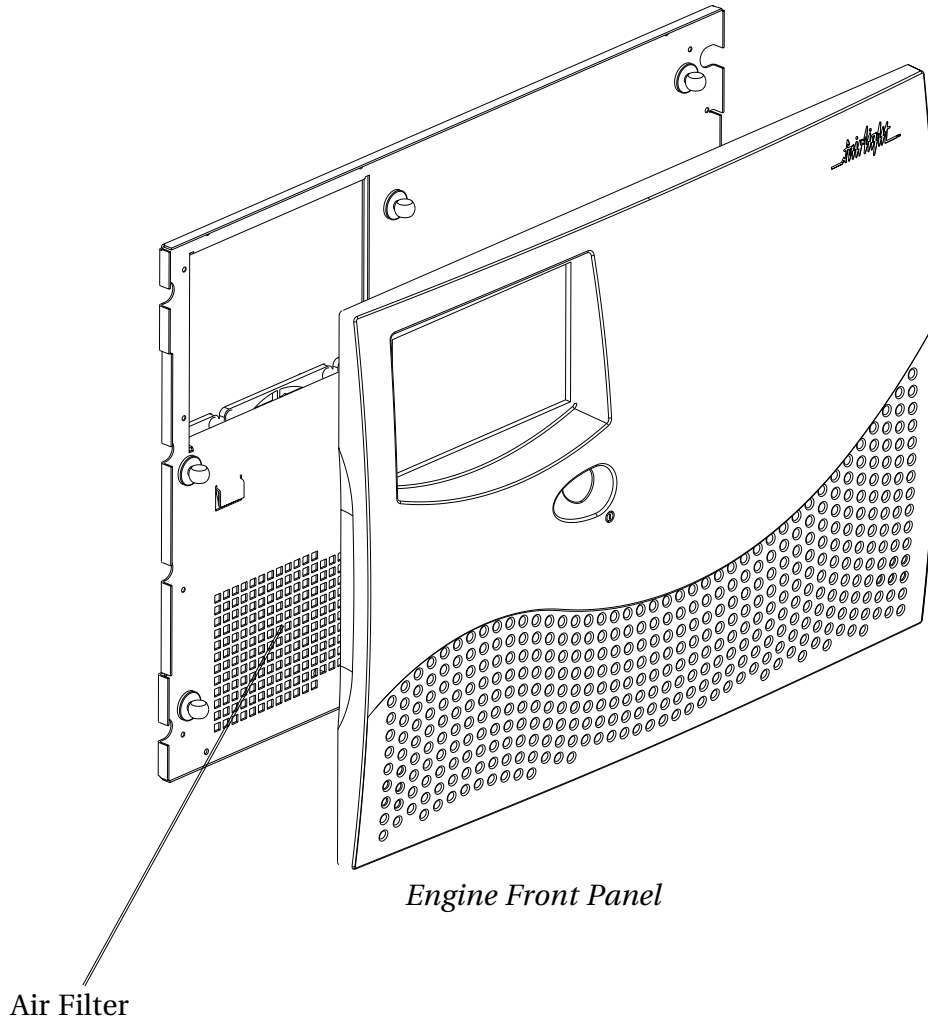
### 6.3 CLEANING THE ENGINE AIR FILTER

To ensure good airflow through the Engine, the air filter in the front panel must be periodically cleaned. It is usually sufficient to simply remove accumulated dust using a vacuum cleaner to suck it out of the front panel grille. From time to time, however, the front panel will have to be removed to give the filter a thorough clean or even replace it altogether. The front dress panel should be removed to allow access to the Air Filter.

1. Gently lift the dress panel away from the Engine.
2. Unclip the Air Filter and remove it from the front fascia of the 2nd panel.
3. Once the air filter has been removed, clean it thoroughly by washing it in warm water with mild detergent. Make sure it is completely dry before reinstalling it.

**CAUTION: DO NOT ALLOW WATER TO GET INSIDE ANY ENCLOSED ASSEMBLY OR COMPONENT. DO NOT CLEAN ANY PLASTIC MATERIALS WITH ORGANIC CLEANING SOLVENTS, SUCH AS BENZENE, TOLUENE, XYLENE, ACETONE, OR SIMILAR COMPOUNDS, BECAUSE THEY MAY DAMAGE THE PLASTIC. CAUTION: DO NOT USE CLEANING FLUIDS, OTHER THAN THOSE MENTIONED IN THE GRAPHICS MONITOR MANUAL, TO CLEAN THE SCREEN - THE SPECIAL COATING COULD BE DAMAGED.**

4. Reverse the above steps to attach the front dress panel back into place.



### **NEW AIR FILTERS**

If the filter cannot be cleaned properly or is worn out, a new one should be ordered. Please contact your local Fairlight office or Distributor.



# APPENDIX - CONNECTION SPECIFICATIONS

## INTRODUCTION

The following information contains all the wiring details to allow users to connect peripheral devices to the back panel of the Engine.

## A1 - AUDIO I/O CONFIGURATION

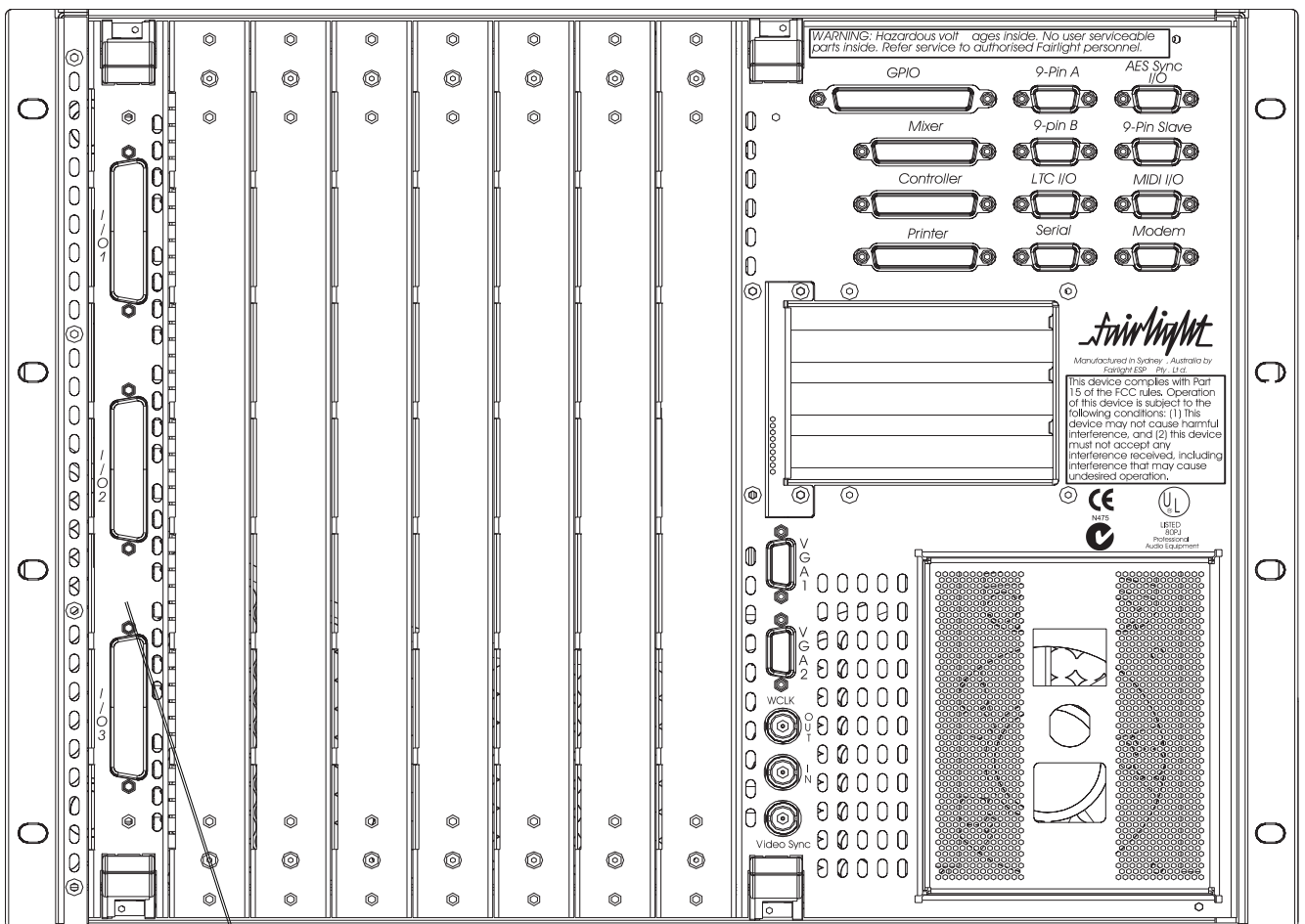
Merlin uses a Fairlight ESP designed proprietary card called the QDC for all its audio I/O and processing. A number of QDC cards can be configured within a Engine. Merlin can be ordered with any of 12 Audio I/O combinations.

On each QDC, a maximum of 6 I/O module boards, can be configured, to allow 8 I/O channels per module. This allows for a maximum of :-

16 analog inputs and 32 analog outputs

or a maximum of 32 digital inputs and digital outputs plus 16 analog inputs per QDC to be available.

The following pages describe the wiring pin outs for each QDC, to enable installation personnel to configure and wire the system.

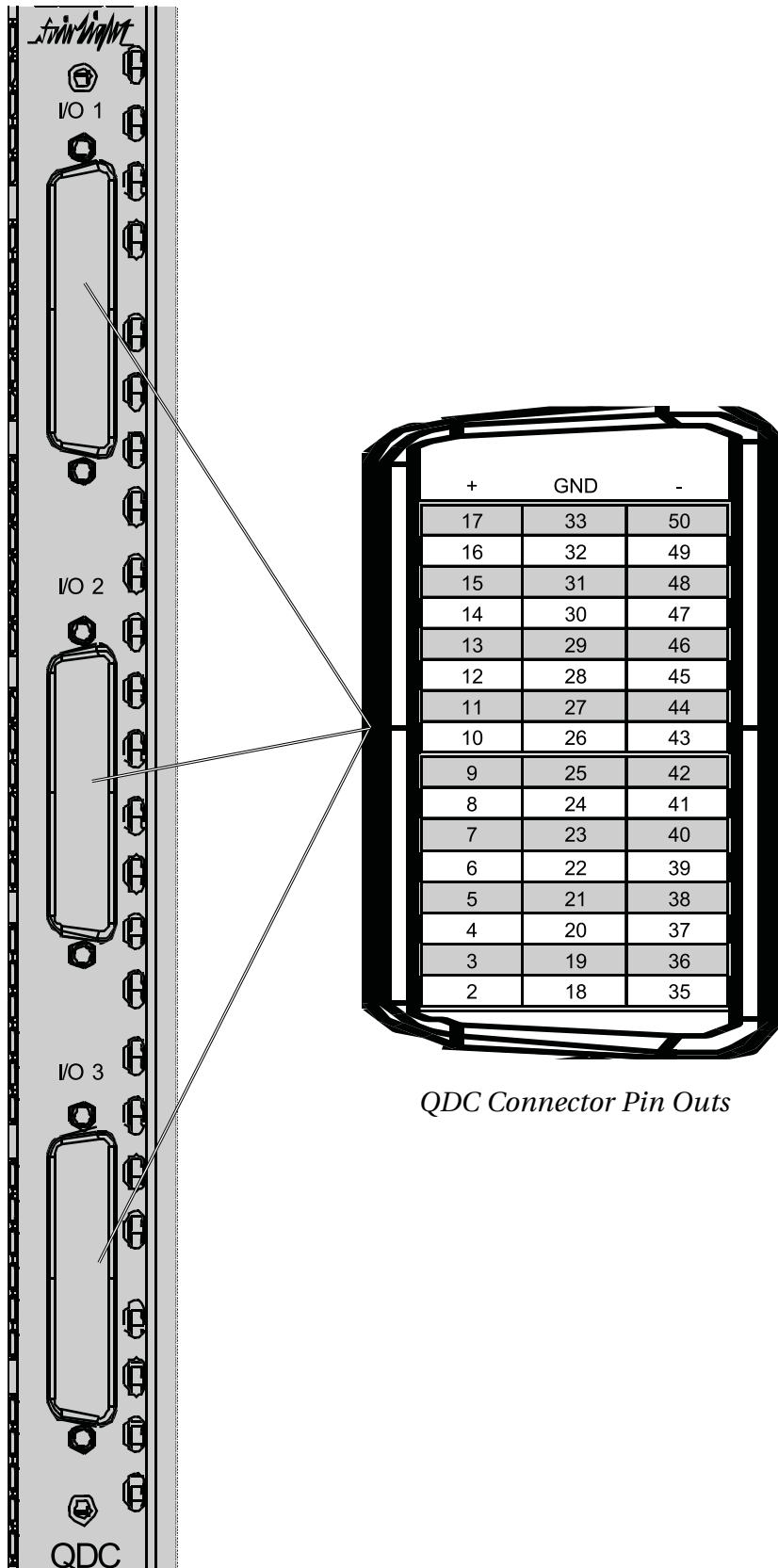


QDC card

Engine Rear Panel

## QDC CONFIGURATION

Each QDC card comes with three connectors, each housing 50 pins. The following tables show the Audio I/O Configurations - the connectors and Pinouts for Merlin. In some configurations more than one QDC card is required to enable all analog and digital I/O.



QDC Connector Pin Outs

---

## **A1.1 ANALOG AUDIO I/O SPECIFICATIONS**

Connector	50 way 3 Row D Female
Input	Balanced
Input Level	+24dbu max
Input Sensitivity	+4dbu nominal (adjustable)
Input Impedence	> 10k Ohms
Output	Electronic balanced differential
Output Level	+24dbu max at 0dBFS, nominal +4dbu
Output Impedence	< 55 Ohms
Output Load	>600 Ohms

## **A1.2 DIGITAL AUDIO I/O SPECIFICATIONS**

Connector	50 way 3 row D Female
Channels	16 stereo pairs per I/O Module
Sample Rates	32KHz, 44.1 KHz, 48Khz, 88.2KHz, 96 KHz, 0.1% run up and run down
Input Type	> 200mV differential
Output level	>4.3V TTL

### 1.1.1 24 Track Digital 24 Digital I/Os 1 QDC Card

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
			+ GND -				+ GND -								+ GND -
								D In 1 - 2	1	2	17 33 50	D Out 1 - 2	1	2	13 29 46
								D In 3 - 4			16 32 49	D Out 3 - 4			12 28 45
								D In 5 - 6			15 31 48	D Out 5 - 6			11 27 44
								D In 7 - 8			14 30 47	D Out 7 - 8			10 26 43
								D In 9 - 10	1	2	9 25 42	D Out 9 - 10	1	2	5 21 38
								D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
								D In 13 - 14			7 23 40	D Out 13 - 14			3 19 36
								D In 15 - 16			6 22 39	D Out 15 - 16			2 18 35
								D In 17 - 18	1	1	9 25 42	D Out 17 - 18	1	1	5 21 38
								D In 19 - 20			8 24 41	D Out 19 - 20			4 20 37
								D In 21 - 22			7 23 40	D Out 21 - 22			3 19 36
								D In 23 - 24			6 22 39	D Out 23 - 24			2 18 35

### 1.1.2 24 Track Mixed I/O      24 Digital I/Os      8 Analog Inputs      1 QDC Card

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	+ GND - 17 33 50					D In 1 - 2	1	2	+ GND - 17 33 50	D Out 1 - 2	1	2	+ GND - 13 29 46
A In 2			16 32 49				16 32 49	D In 3 - 4			15 31 48	D Out 3 - 4			12 28 45
A In 3			15 31 48				15 31 48	D In 5 - 6			14 30 47	D Out 5 - 6			11 27 44
A In 4			14 30 47				14 30 47	D In 7 - 8			9 25 42	D Out 7 - 8			10 26 43
A In 5			13 29 46				8 24 41	D In 9 - 10	1	2	7 23 40	D Out 9 - 10	1	2	5 21 38
A In 6			12 28 45				6 22 39	D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
A In 7			11 27 44				7 23 40	D In 13 - 14			9 25 42	D Out 13 - 14			3 19 36
A In 8			10 26 43				8 24 41	D In 15 - 16	1	1	7 23 40	D Out 15 - 16			2 18 35
							7 23 40	D In 17 - 18			8 24 41	D Out 17 - 18	1	1	5 21 38
							6 22 39	D In 19 - 20			7 23 40	D Out 19 - 20			4 20 37
							8 24 41	D In 21 - 22			6 22 39	D Out 21 - 22			3 19 36
							6 22 39	D In 23 - 24			7 23 40	D Out 23 - 24			2 18 35

### 1.1.3 24 Track Analog      24 Analog Inputs      24 Analog Outputs      2 QDC Cards

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50	A Out 1	1	1	9 25 42								
A In 2			16 32 49	A Out 2			8 24 41								
A In 3			15 31 48	A Out 3			7 23 40								
A In 4			14 30 47	A Out 4			6 22 39								
A In 5			13 29 46	A Out 5			5 21 38								
A In 6			12 28 45	A Out 6			4 20 37								
A In 7			11 27 44	A Out 7			3 19 36								
A In 8			10 26 43	A Out 8			2 18 35								
A In 9	1	3	17 33 50	A Out 9	1	3	9 25 42								
A In 10			16 32 49	A Out 10			8 24 41								
A In 11			15 31 48	A Out 11			7 23 40								
A In 12			14 30 47	A Out 12			6 22 39								
A In 13			13 29 46	A Out 13			5 21 38								
A In 14			12 28 45	A Out 14			4 20 37								
A In 15			11 27 44	A Out 15			3 19 36								
A In 16			10 26 43	A Out 16			2 18 35								
A In 17	2	1	17 33 50	A Out 17	1	2	17 33 50								
A In 18			16 32 49	A Out 18			16 32 49								
A In 19			15 31 48	A Out 19			15 31 48								
A In 20			14 30 47	A Out 20			14 30 47								
A In 21			13 29 46	A Out 21			13 29 46								
A In 22			12 28 45	A Out 22			12 28 45								
A In 23			11 27 44	A Out 23			11 27 44								
A In 24			10 26 43	A Out 24			10 26 43								

### 1.1.4 24 Track Analog plus Digital 24 Digital I/Os – 24 Analog Inputs – 24 Analog Outputs 2 QDC Cards

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50	A Out 1	1	1	9 25 42	D In 1 - 2	1	2	17 33 50	D Out 1 - 2	1	2	13 29 46
A In 2			16 32 49	A Out 2			8 24 41	D In 3 - 4			16 32 49	D Out 3 - 4			12 28 45
A In 3			15 31 48	A Out 3			7 23 40	D In 5 - 6			15 31 48	D Out 5 - 6			11 27 44
A In 4			14 30 47	A Out 4			6 22 39	D In 7 - 8			14 30 47	D Out 7 - 8			10 26 43
A In 5			13 29 46	A Out 5			5 21 38	D In 9 - 10	1	2	9 25 42	D Out 9 - 10	1	2	5 21 38
A In 6			12 28 45	A Out 6			4 20 37	D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
A In 7			11 27 44	A Out 7			3 19 36	D In 13 - 14			7 23 40	D Out 13 - 14			3 19 36
A In 8			10 26 43	A Out 8			2 18 35	D In 15 - 16			6 22 39	D Out 15 - 16			2 18 35
A In 9	1	3	17 33 50	A Out 9	1	3	9 25 42	D In 17 - 18	2	2	17 33 50	D Out 17 - 18	2	2	13 29 46
A In 10			16 32 49	A Out 10			8 24 41	D In 19 - 20			16 32 49	D Out 19 - 20			12 28 45
A In 11			15 31 48	A Out 11			7 23 40	D In 21 - 22			15 31 48	D Out 21 - 22			11 27 44
A In 12			14 30 47	A Out 12			6 22 39	D In 23 - 24			14 30 47	D Out 23 - 24			10 26 43
A In 13			13 29 46	A Out 13			5 21 38								
A In 14			12 28 45	A Out 14			4 20 37								
A In 15			11 27 44	A Out 15			3 19 36								
A In 16			10 26 43	A Out 16			2 18 35								
A In 17	2	1	17 33 50	A Out 17	2	1	9 25 42								
A In 18			16 32 49	A Out 18			8 24 41								
A In 19			15 31 48	A Out 19			7 23 40								
A In 20			14 30 47	A Out 20			6 22 39								
A In 21			13 29 46	A Out 21			5 21 38								
A In 22			12 28 45	A Out 22			4 20 37								
A In 23			11 27 44	A Out 23			3 19 36								
A In 24			10 26 43	A Out 24			2 18 35								

## 2.1.1 32 Track Digital 2 QDC Cards

### 32 Digital I/Os

### 32 Track Digital

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
			+ GND -				+ GND -	D In 1 - 2	1	2	17 33 50	D Out 1 - 2	1	2	13 29 46
								D In 3 - 4			16 32 49	D Out 3 - 4			12 28 45
								D In 5 - 6			15 31 48	D Out 5 - 6			11 27 44
								D In 7 - 8			14 30 47	D Out 7 - 8			10 26 43
								D In 9 - 10	1	2	9 25 42	D Out 9 - 10	1	2	5 21 38
								D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
								D In 13 - 14			7 23 40	D Out 13 - 14			3 19 36
								D In 15 - 16			6 22 39	D Out 15 - 16			2 18 35
								D In 17 - 18	1	1	9 25 42	D Out 17 - 18	1	1	5 21 38
								D In 19 - 20			8 24 41	D Out 19 - 20			4 20 37
								D In 21 - 22			7 23 40	D Out 21 - 22			3 19 36
								D In 23 - 24			6 22 39	D Out 23 - 24			2 18 35
								D In 25 - 26	2	2	17 33 50	D Out 25 - 26	2	2	13 29 46
								D In 27 - 28			16 32 49	D Out 27 - 28			12 28 45
								D In 29 - 30			15 31 48	D Out 29 - 30			11 27 44
								D In 31 - 32			14 30 47	D Out 31 - 32			10 26 43



### 2.1.2 32 Track Mixed I/O32 Digital I/O – 16 Analog Inputs 1 QDC Card

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50				+ GND -	D In 1 - 2	1	2	17 33 50	D Out 1 - 2	1	2	13 29 46
A In 2			16 32 49					D In 3 - 4			16 32 49	D Out 3 - 4			12 28 45
A In 3			15 31 48					D In 5 - 6			15 31 48	D Out 5 - 6			11 27 44
A In 4			14 30 47					D In 7 - 8			14 30 47	D Out 7 - 8			10 26 43
A In 5			13 29 46					D In 9 - 10	1	2	9 25 42	D Out 9 - 10	1	2	5 21 38
A In 6			12 28 45					D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
A In 7			11 27 44					D In 13 - 14			7 23 40	D Out 13 - 14			3 19 36
A In 8			10 26 43					D In 15 - 16			6 22 39	D Out 15 - 16			2 18 35
A In 9	1	3	17 33 50					D In 17 - 18	2	2	17 33 50	D Out 17 - 18	2	2	13 29 46
A In 10			16 32 49					D In 19 - 20			16 32 49	D Out 19 - 20			12 28 45
A In 11			15 31 48					D In 21 - 22			15 31 48	D Out 21 - 22			11 27 44
A In 12			14 30 47					D In 23 - 24			14 30 47	D Out 23 - 24			10 26 43
A In 13			13 29 46					D In 25 - 26	2	2	9 25 42	D Out 25 - 26	2	2	5 21 38
A In 14			12 28 45					D In 27 - 28			8 24 41	D Out 27 - 28			4 20 37
A In 15			11 27 44					D In 29 - 30			7 23 40	D Out 29 - 30			3 19 36
A In 16			10 26 43					D In 31 - 32			6 22 39	D Out 31 - 32			2 18 35

2.1.3 32 Track Analog 32 Analog Inputs 32 Analog Outputs 2 QDC Cards

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50	A Out 1	1	1	9 25 42								
A In 2			16 32 49	A Out 2			8 24 41								
A In 3			15 31 48	A Out 3			7 23 40								
A In 4			14 30 47	A Out 4			6 22 39								
A In 5			13 29 46	A Out 5			5 21 38								
A In 6			12 28 45	A Out 6			4 20 37								
A In 7			11 27 44	A Out 7			3 19 36								
A In 8			10 26 43	A Out 8			2 18 35								
A In 9	1	3	17 33 50	A Out 9	1	3	9 25 42								
A In 10			16 32 49	A Out 10			8 24 41								
A In 11			15 31 48	A Out 11			7 23 40								
A In 12			14 30 47	A Out 12			6 22 39								
A In 13			13 29 46	A Out 13			5 21 38								
A In 14			12 28 45	A Out 14			4 20 37								
A In 15			11 27 44	A Out 15			3 19 36								
A In 16			10 26 43	A Out 16			2 18 35								
A In 17	2	1	17 33 50	A Out 17	1	2	9 25 42								
A In 18			16 32 49	A Out 18			8 24 41								
A In 19			15 31 48	A Out 19			7 23 40								
A In 20			14 30 47	A Out 20			6 22 39								
A In 21			13 29 46	A Out 21			5 21 38								
A In 22			12 28 45	A Out 22			4 20 37								
A In 23			11 27 44	A Out 23			3 19 36								
A In 24			10 26 43	A Out 24			2 18 35								
A In 25	2	3	17 33 50	A Out 25	1	2	9 25 42								
A In 26			16 32 49	A Out 26			8 24 41								
A In 27			15 31 48	A Out 27			7 23 40								
A In 28			14 30 47	A Out 28			6 22 39								
A In 29			13 29 46	A Out 29			5 21 38								
A In 30			12 28 45	A Out 30			4 20 37								
A In 31			11 27 44	A Out 31			3 19 36								
A In 32			10 26 43	A Out 32			2 18 35								

### 2.1.4 32 Track Analog plus Digital 32 Digital I/Os – 32 Analog Inputs – 32 Analog Outputs 2 QDC Cards

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50	A Out 1	1	1	9 25 42	D In 1-2	1	2	17 33 50	D Out 1-2	1	2	13 29 46
A In 2			16 32 49	A Out 2			8 24 41	D In 3-4			16 32 49	D Out 3-4			12 28 45
A In 3			15 31 48	A Out 3			7 23 40	D In 5-6			15 31 48	D Out 5-6			11 27 44
A In 4			14 30 47	A Out 4			6 22 39	D In 7-8			14 30 47	D Out 7-8			10 26 43
A In 5			13 29 46	A Out 5			5 21 38	D In 9-10	1	2	9 25 42	D Out 9-10	1	2	5 21 38
A In 6			12 28 45	A Out 6			4 20 37	D In 11-12			8 24 41	D Out 11-12			4 20 37
A In 7			11 27 44	A Out 7			3 19 36	D In 13-14			7 23 40	D Out 13-14			3 19 36
A In 8			10 26 43	A Out 8			2 18 35	D In 15-16			6 22 39	D Out 15-16			2 18 35
A In 9	1	3	17 33 50	A Out 9	1	3	9 25 42	D In 17-18	2	2	17 33 50	D Out 17-18	2	2	13 29 46
A In 10			16 32 49	A Out 10			8 24 41	D In 19-20			16 32 49	D Out 19-20			12 28 45
A In 11			15 31 48	A Out 11			7 23 40	D In 21-22			15 31 48	D Out 21-22			11 27 44
A In 12			14 30 47	A Out 12			6 22 39	D In 23-24			14 30 47	D Out 23-24			10 26 43
A In 13			13 29 46	A Out 13			5 21 38	D In 25-26	2	2	9 25 42	D Out 25-26	2	2	5 21 38
A In 14			12 28 45	A Out 14			4 20 37	D In 27-28			8 24 41	D Out 27-28			4 20 37
A In 15			11 27 44	A Out 15			3 19 36	D In 29-30			7 23 40	D Out 29-30			3 19 36
A In 16			10 26 43	A Out 16			2 18 35	D In 31-32			6 22 39	D Out 31-32			2 18 35
A In 17	2	1	17 33 50	A Out 17	2	1	9 25 42								
A In 18			16 32 49	A Out 18			8 24 41								
A In 19			15 31 48	A Out 19			7 23 40								
A In 20			14 30 47	A Out 20			6 22 39								
A In 21			13 29 46	A Out 21			5 21 38								
A In 22			12 28 45	A Out 22			4 20 37								
A In 23			11 27 44	A Out 23			3 19 36								
A In 24			10 26 43	A Out 24			2 18 35								
A In 25	2	3	17 33 50	A Out 25	2	3	9 25 42								
A In 26			16 32 49	A Out 26			8 24 41								
A In 27			15 31 48	A Out 27			7 23 40								
A In 28			14 30 47	A Out 28			6 22 39								
A In 29			13 29 46	A Out 29			5 21 38								
A In 30			12 28 45	A Out 30			4 20 37								
A In 31			11 27 44	A Out 31			3 19 36								
A In 32			10 26 43	A Out 32			2 18 35								

### 3.1.1 48 Track Digital 48 Digital I/Os 2 QDC Cards

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
			+ GND -				+ GND -								
								D In 1 - 2	1	2	17 33 50	D Out 1 - 2	1	2	13 29 46
								D In 3 - 4			16 32 49	D Out 3 - 4			12 28 45
								D In 5 - 6			15 31 48	D Out 5 - 6			11 27 44
								D In 7 - 8			14 30 47	D Out 7 - 8			10 26 43
								D In 9 - 10	1	2	9 25 42	D Out 9 - 10	1	2	5 21 38
								D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
								D In 13 - 14			7 23 40	D Out 13 - 14			3 19 36
								D In 15 - 16			6 22 39	D Out 15 - 16			2 18 35
								D In 17 - 18	1	3	9 25 42	D Out 17 - 18	1	3	5 21 38
								D In 19 - 20			8 24 41	D Out 19 - 20			4 20 37
								D In 21 - 22			7 23 40	D Out 21 - 22			3 19 36
								D In 23 - 24			6 22 39	D Out 23 - 24			2 18 35
								D In 25 - 26	1	1	9 25 42	D Out 25 - 26	1	1	5 21 38
								D In 27 - 28			8 24 41	D Out 27 - 28			4 20 37
								D In 29 - 30			7 23 40	D Out 29 - 30			3 19 36
								D In 31 - 32			6 22 39	D Out 31 - 32			2 18 35
								D In 33 - 34	2	2	17 33 50	D Out 33 - 34	2	2	13 29 46
								D In 35 - 36			16 32 49	D Out 35 - 36			12 28 45
								D In 37 - 38			15 31 48	D Out 37 - 38			11 27 44
								D In 39 - 40			14 30 47	D Out 39 - 40			10 26 43
								D In 41 - 42	2	2	9 25 42	D Out 41 - 42	2	2	5 21 38
								D In 43 - 44			8 24 41	D Out 43 - 44			4 20 37
								D In 45 - 46			7 23 40	D Out 45 - 46			3 19 36
								D In 47 - 48			6 22 39	D Out 47 - 48			2 18 35

### 3.1.2 48 Track Mixed I/O      48 Digital I/Os      16 Analog Inputs      2 QDC Cards

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50				+ GND -	D In 1 - 2	1	2	17 33 50	D Out 1 - 2	1	2	13 29 46
A In 2			16 32 49					D In 3 - 4			16 32 49	D Out 3 - 4			12 28 45
A In 3			15 31 48					D In 5 - 6			15 31 48	D Out 5 - 6			11 27 44
A In 4			14 30 47					D In 7 - 8			14 30 47	D Out 7 - 8			10 26 43
A In 5			13 29 46					D In 9 - 10	1	2	9 25 42	D Out 9 - 10	1	2	5 21 38
A In 6			12 28 45					D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
A In 7			11 27 44					D In 13 - 14			7 23 40	D Out 13 - 14			3 19 36
A In 8			10 26 43					D In 15 - 16			6 22 39	D Out 15 - 16			2 18 35
A In 9	1	3	17 33 50					D In 17 - 18	2	2	17 33 50	D Out 17 - 18	2	2	13 29 46
A In 10			16 32 49					D In 19 - 20			16 32 49	D Out 19 - 20			12 28 45
A In 11			15 31 48					D In 21 - 22			15 31 48	D Out 21 - 22			11 27 44
A In 12			14 30 47					D In 23 - 24			14 30 47	D Out 23 - 24			10 26 43
A In 13			13 29 46					D In 25 - 26	2	2	9 25 42	D Out 25 - 26	2	2	5 21 38
A In 14			12 28 45					D In 27 - 28			8 24 41	D Out 27 - 28			4 20 37
A In 15			11 27 44					D In 29 - 30			7 23 40	D Out 29 - 30			3 19 36
A In 16			10 26 43					D In 31 - 32			6 22 39	D Out 31 - 32			2 18 35
								D In 33 - 34	2	3	9 25 42	D Out 33 - 34	2	3	5 29 46
								D In 35 - 36			8 24 41	D Out 35 - 36			4 28 45
								D In 37 - 38			7 23 40	D Out 37 - 38			3 27 44
								D In 39 - 40			6 22 39	D Out 39 - 40			2 26 43
								D In 41 - 42	2	1	9 25 42	D Out 41 - 42	2	1	5 21 38
								D In 43 - 44			8 24 41	D Out 43 - 44			4 20 37
								D In 45 - 46			7 23 40	D Out 45 - 46			3 19 36
								D In 47 - 48			6 22 39	D Out 47 - 48			2 18 35

### 3.1.3 48 Track Analog 32 Analog Inputs 48 Analog Outputs 2 QDC Cards

Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50 + GND -	A Out 1	1	1	9 25 42 + GND -								
A In 2			16 32 49	A Out 2			8 24 41								
A In 3			15 31 48	A Out 3			7 23 40								
A In 4			14 30 47	A Out 4			6 22 39								
A In 5			13 29 46	A Out 5			5 21 38								
A In 6			12 28 45	A Out 6			4 20 37								
A In 7			11 27 44	A Out 7			3 19 36								
A In 8			10 26 43	A Out 8			2 18 35								
A In 9	1	3	17 33 50	A Out 9	1	3	9 25 42								
A In 10			16 32 49	A Out 10			8 24 41								
A In 11			15 31 48	A Out 11			7 23 40								
A In 12			14 30 47	A Out 12			6 22 39								
A In 13			13 29 46	A Out 13			5 21 38								
A In 14			12 28 45	A Out 14			4 20 37								
A In 15			11 27 44	A Out 15			3 19 36								
A In 16			10 26 43	A Out 16			2 18 35								
A In 17	2	1	17 33 50	A Out 17	1	2	17 33 50								
A In 18			16 32 49	A Out 18			16 32 49								
A In 19			15 31 48	A Out 19			15 31 48								
A In 20			14 30 47	A Out 20			14 30 47								
A In 21			13 29 46	A Out 21			13 29 46								
A In 22			12 28 45	A Out 22			12 28 45								
A In 23			11 27 44	A Out 23			11 27 44								
A In 24			10 26 43	A Out 24			10 26 43								
A In 25	2	3	17 33 50	A Out 25	1	2	9 25 42								
A In 26			16 32 49	A Out 26			8 24 41								
A In 27			15 31 48	A Out 27			7 23 40								
A In 28			14 30 47	A Out 28			6 22 39								

A In 29	13 29 46	A Out 29	5 21 38		
A In 30	12 28 45	A Out 30	4 20 37		
A In 31	11 27 44	A Out 31	3 19 36		
A In 32	10 26 43	A Out 32	2 18 35		
		A Out 33	9 25 42	1	
		A Out 34	8 24 41		
		A Out 35	7 23 40		
		A Out 36	6 22 39		
		A Out 37	5 21 38		
		A Out 38	4 20 37		
		A Out 39	3 19 36		
		A Out 40	2 18 35		
		A Out 41	9 25 42	3	
		A Out 42	8 24 41		
		A Out 43	7 23 40		
		A Out 44	6 22 39		
		A Out 45	5 21 38		
		A Out 46	4 20 37		
		A Out 47	3 19 36		
		A Out 48	2 18 35		

### 3.1.4 48 Track Analog plus Digital 48 Digital I/Os 48 Analog Inputs 48 Analog Outputs 3 QDC Cards

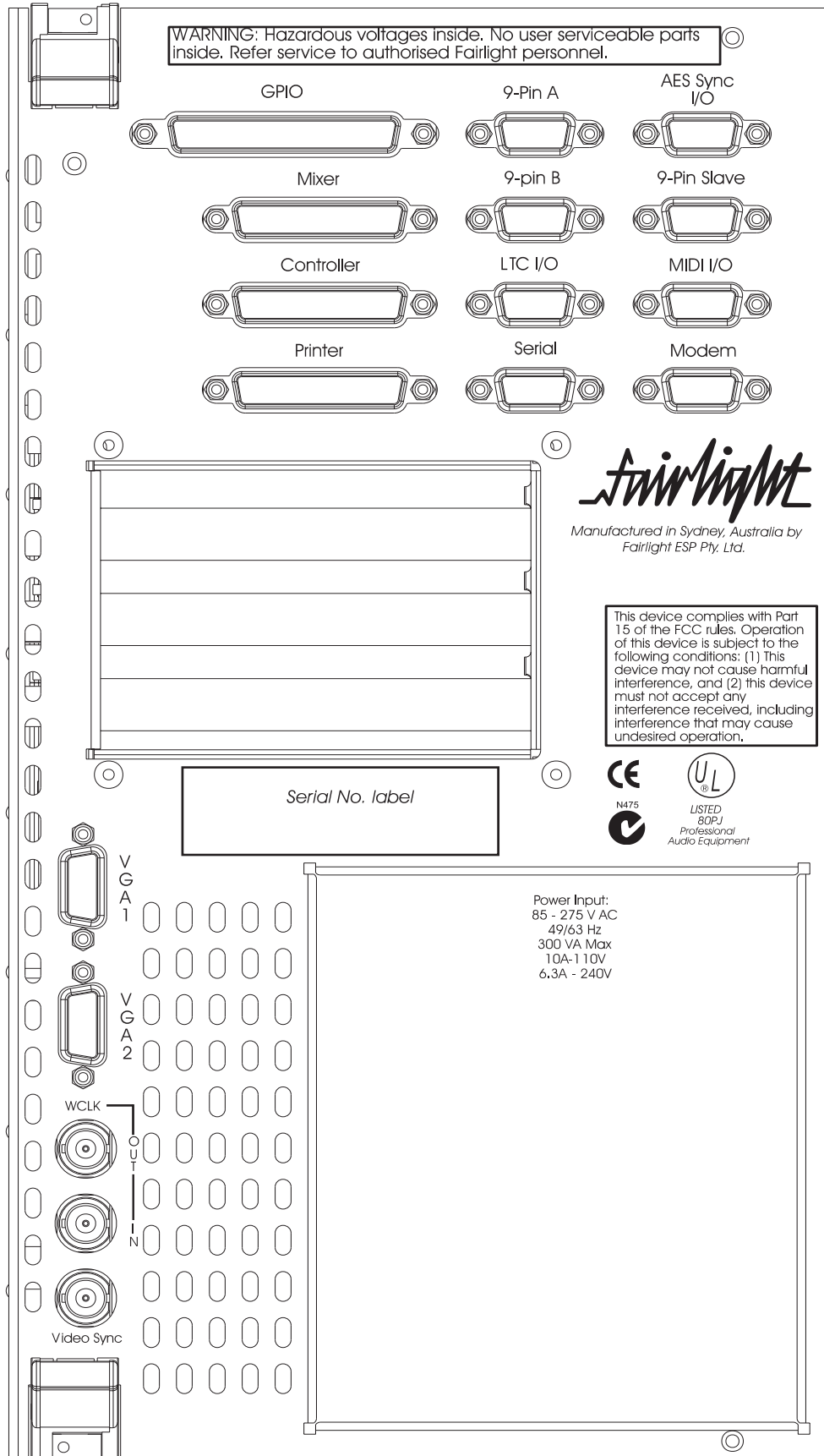
Analog Inputs				Analog Outputs				Digital Inputs				Digital Outputs			
Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins	Port	QDC	Con	Pins
A In 1	1	1	17 33 50	A Out 1	1	1	9 25 42	D In 1 - 2	1	2	17 33 50	D Out 1 - 2	1	2	13 29 46
A In 2			16 32 49	A Out 2			8 24 41	D In 3 - 4			16 32 49	D Out 3 - 4			12 28 45
A In 3			15 31 48	A Out 3			7 23 40	D In 5 - 6			15 31 48	D Out 5 - 6			11 27 44
A In 4			14 30 47	A Out 4			6 22 39	D In 7 - 8			14 30 47	D Out 7 - 8			10 26 43
A In 5			13 29 46	A Out 5			5 21 38	D In 9 - 10	1	2	9 25 42	D Out 9 - 10	1	2	5 21 38
A In 6			12 28 45	A Out 6			4 20 37	D In 11 - 12			8 24 41	D Out 11 - 12			4 20 37
A In 7			11 27 44	A Out 7			3 19 36	D In 13 - 14			7 23 40	D Out 13 - 14			3 19 36
A In 8			10 26 43	A Out 8			2 18 35	D In 15 - 16			6 22 39	D Out 15 - 16			2 18 35
A In 9	1	3	17 33 50	A Out 9	1	3	9 25 42	D In 17 - 18	2	2	17 33 50	D Out 17 - 18	2	2	13 29 46
A In 10			16 32 49	A Out 10			8 24 41	D In 19 - 20			16 32 49	D Out 19 - 20			12 28 45
A In 11			15 31 48	A Out 11			7 23 40	D In 21 - 22			15 31 48	D Out 21 - 22			11 27 44
A In 12			14 30 47	A Out 12			6 22 39	D In 23 - 24			14 30 47	D Out 23 - 24			10 26 43
A In 13			13 29 46	A Out 13			5 21 38	D In 25 - 26	2	2	9 25 42	D Out 25 - 26	2	2	5 21 38
A In 14			12 28 45	A Out 14			4 20 37	D In 27 - 28			8 24 41	D Out 27 - 28			4 20 37
A In 15			11 27 44	A Out 15			3 19 36	D In 29 - 30			7 23 40	D Out 29 - 30			3 19 36
A In 16			10 26 43	A Out 16			2 18 35	D In 31 - 32			6 22 39	D Out 31 - 32			2 18 35
A In 17	2	1	17 33 50	A Out 17	2	1	9 25 42	D In 33 - 34	3	2	17 33 50	D Out 33 - 34	3	2	13 29 46
A In 18			16 32 49	A Out 18			8 24 41	D In 35 - 36			16 32 49	D Out 35 - 36			12 28 45
A In 19			15 31 48	A Out 19			7 23 40	D In 37 - 38			15 31 48	D Out 37 - 38			11 27 44
A In 20			14 30 47	A Out 20			6 22 39	D In 39 - 40			14 30 47	D Out 39 - 40			10 26 43
A In 21			13 29 46	A Out 21			5 21 38	D In 41 - 42	3	2	9 25 42	D Out 41 - 42	3	2	5 21 38
A In 22			12 28 45	A Out 22			4 20 37	D In 43 - 44			8 24 41	D Out 43 - 44			4 20 37
A In 23			11 27 44	A Out 23			3 19 36	D In 45 - 46			7 23 40	D Out 45 - 46			3 19 36
A In 24			10 26 43	A Out 24			2 18 35	D In 47 - 48			6 22 39	D Out 47 - 48			2 18 35
A In 25	2	3	17 33 50	A Out 25	2	3	9 25 42								
A In 26			16 32 49	A Out 26			8 24 41								



A In 27	15 31 48	A Out 27	7 23 40		
A In 28	14 30 47	A Out 28	6 22 39		
A In 29	13 29 46	A Out 29	5 21 38		
A In 30	12 28 45	A Out 30	4 20 37		
A In 31	11 27 44	A Out 31	3 19 36		
A In 32	10 26 43	A Out 32	2 18 35		
A In 33	1 17 33 50	A Out 33	1 9 25 42		
A In 34	16 32 49	A Out 34	8 24 41		
A In 35	15 31 48	A Out 35	7 23 40		
A In 36	14 30 47	A Out 36	6 22 39		
A In 37	13 29 46	A Out 37	5 21 38		
A In 38	12 28 45	A Out 38	4 20 37		
A In 39	11 27 44	A Out 39	3 19 36		
A In 40	10 26 43	A Out 40	2 18 35		
A In 41	3 17 33 50	A Out 41	3 9 25 42		
A In 42	16 32 49	A Out 42	8 24 41		
A In 43	15 31 48	A Out 43	7 23 40		
A In 44	14 30 47	A Out 44	6 22 39		
A In 45	13 29 46	A Out 45	5 21 38		
A In 46	12 28 45	A Out 46	4 20 37		
A In 47	11 27 44	A Out 47	3 19 36		
A In 48	10 26 43	A Out 48	2 18 35		

# APPENDIX - CONNECTION & SIGNAL SPECIFICATIONS

## A2 CONTROL & REFERENCE PINOUTS



Engine System I/O Panel

## A3 GENERAL PURPOSE INTERFACE

Connector            37 Pin D Male  
 Input                 TTL (1 LS Load)  
 Output/Bank        TTL (max 5 TTL loads)



1	GND
2	GPIO 6
3	GPIO 5
4	GND
5	GPIO BO 2
6	GPIO BO 1
7	GND
8	GPIO IN 6
9	GPIO IN 5
10	GND
11	GPIO IN 2
12	GPIO IN 1
13	GND
14	GPIO OUT 6
15	GPIO OUT 5
16	GND
17	GPIO OUT 2
18	GPIO OUT 1
19	GND
20	GPIO B 0 7
21	GND
22	GPI
23	GPIO BO 3
24	GND
25	GPIO BO 0
26	GPIO IN 7
27	GND
28	GPIO IN 4
29	GPIO IN 3
30	GND
31	GPIO IN 0
32	GPIO OUT 7
33	GND
34	GPIO OUT 4
35	GPIO OUT 3
36	GND
37	GPIO OUT 0

## A4 MIXER

Connector 25 pin D Female



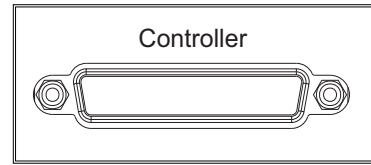
1	GND
2	RxFFN
3	RxCLKN
4	RxDATN
5	RxWRN
6	NC
7	NC
8	TxFFN
9	TxCLKN
10	TxDATN
11	TxWRPN
12	HSSLDETn
13	SYNCN
14	RxFFP
15	RxCLKP
16	RxDATP
17	RxWRP
18	NC
19	GND
20	TxFFP
21	TXxCLKP
22	TxDATP
23	TxWRP
24	GND
25	SYNCP

## A5 CONTROLLER

Connector 25 pin D Female at Engine End

37 pin D Male at Console End

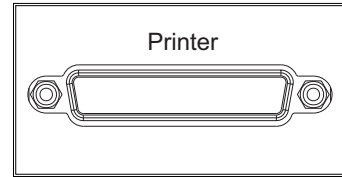
9 pin pigtail D Male at Console End



25 Pin D Type Connector Female	Signal Name	Pairing Details	Signal Name	37 Pin D Type Connector Male
1	GND	Pair 1	GND	1
2	CONTx	Pair 1	RSI2	7
3	CONRx	Pair 2	RSO2	24
5	H-TxDATA	Pair 5	RSO1	6
7	GND	Pair 2	GND	10
9	GND	Pair 5	GND	33
10	CONTxPOS	Pair 3	FS+	13
11	CONRxPOS	Pair 4	TS+	12
20	H-RxDATA	Pair 6	RSI1	25
21	GND	Pair 6	*PR	23
23	CONTxNEG	Pair 3	FS-	31
24	CONRxNEG	Pair 4	TS-	30
9 Pin D Type Connector Male	Signal Name	Pairing Details	Signal Name	37 Pin D Type Connector Male
2	MRXD	Any	MRXD	36
3	MTXD	Any	MTXD	37
5	Gnd	any	Gnd	33

## A6 PRINTER

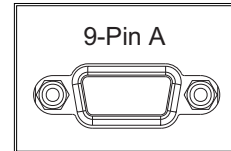
Connector      Standard 25 pin D female



PIN 1	PSTROBE <sub>n</sub>
PIN 2	PDR0
PIN 3	PDR1
PIN 4	PDR2
PIN 5	PDR3
PIN 6	PDR4
PIN 7	PDR5
PIN 8	PDR6
PIN 9	PDR7
PIN 10	PRACK <sub>n</sub>
PIN 11	PRBUSY <sub>n</sub>
PIN 12	PRERROR
PIN 13	PRSELECT
PIN 14	PRAUTOFD <sub>n</sub>
PIN 15	PRFAULT <sub>n</sub>
PIN 16	PRINTIT <sub>n</sub>
PIN 17	PRSELIN <sub>n</sub>
PIN 18	GND
PIN 19	GND
PIN 20	GND
PIN 21	GND
PIN 22	GND
PIN 23	GND
PIN 24	GND
PIN 25	GND

## A8 9-PIN A

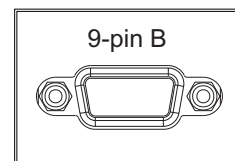
Connector 9 pin D Female



PIN 1	GND
PIN 2	9ARxA
PIN 3	9ATxB
PIN 4	GND
PIN 5	NC
PIN 6	GND
PIN 7	9ARxB
PIN 8	9ATxA
PIN 9	NC

## A9 9-PIN B

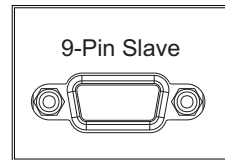
Connector 9 pin D Female



PIN 1	GND
PIN 2	9BRxA
PIN 3	9BTxB
PIN 4	GND
PIN 5	NC
PIN 6	GND
PIN 7	9BRxB
PIN 8	9BTxA
PIN 9	NC

## A10 9-PIN SLAVE

Connector 9 pin D Female



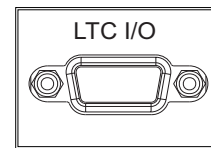
PIN 1	GND
PIN 2	9BTxA
PIN 3	9RRxB
PIN 4	GND
PIN 5	NC
PIN 6	GND
PIN 7	9BTxB
PIN 8	9BRxA
PIN 9	GND

## A11 LTC - I/O

Connector 9 pin D Male

Input Level -20dbm to +10dbm

Output Level 0dbm



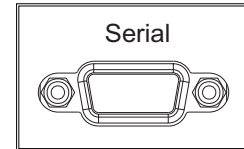
Important note: Unbalanced loads connected to LTC OUT should NOT ground the LTC OUT NEGATIVE signal.

PIN 1	GND
PIN 2	LTC A NEGATIVE
PIN 3	LTC OUT NEGATIVE
PIN 4	GND
PIN 5	LTC B POSITIVE
PIN 6	LTC A POSITIVE
PIN 7	GND
PIN 8	LTC OUT POSITIVE
PIN 9	LTC B NEGATIVE



## A12 SERIAL PORT

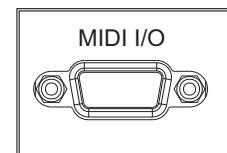
Connector    Standard 9 pin D male



PIN 1	SER_DCD
PIN 2	SER_Rx
PIN 3	SER_Tx
PIN 4	SER_DTR
PIN 5	GND
PIN 6	SER_DSR
PIN 7	SER_RTS
PIN 8	SER_CTS
PIN 9	NC

## A13 MIDI I/O

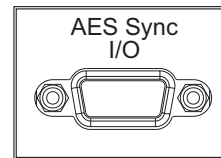
Connector    9 pin D female



PIN 1	NOT CONNECTED		
PIN 2	MIDI IN NEGATIVE	MIDI IN	DIN PIN 5
PIN 3	MIDI OUT NEGATIVE	MIDI OUT	DIN PIN 5
PIN 4	GND	MIDI THROUGH	DIN PIN 2
PIN 5	MIDI THROUGH POSITIVE	MIDI THROUGH	DIN PIN 4
PIN 6	MIDI POSITIVE	MIDI IN	DIN PIN 4
PIN 7	GND	MIDI OUT	DIN PIN 2
PIN 8	MIDI OUT POSITIVE	MIDI OUT	DIN PIN 4
PIN 9	MIDI THROUGH NEGATIVE	MIDI THROUGH	DIN PIN 5

## A14 AES SYNC I/O

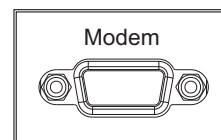
Connector 9 pin D Male



PIN 1	GND
PIN 2	AES IN NEGATIVE
PIN 3	AES OUT POSITIVE
PIN 4	BIPHASE TACH
PIN 5	BIP DIRECTION
PIN 6	AES IN POSITIVE
PIN 7	GND
PIN 8	AES OUT NEGATIVE
PIN 9	NOT CONNECTED

## A15 MODEM

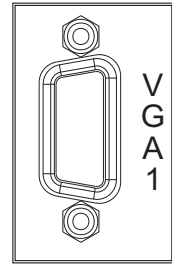
Connector 9 pin D Male



PIN 1	MOD_DCD
PIN 2	MOD_RX
PIN 3	MOD_TX
PIN 4	MOD_DTR
PIN 5	GND
PIN 6	MOD_DSR
PIN 7	MOD_RTS
PIN 8	MOS_CTS
PIN 9	NC

## A16 VGA

Connector            15 pin High Density D Female  
 Resolution            1024(H) x 768(V)  
 Frequency            HSYNC: 60khz    VSYNC: 75hz SVGA STANDARD



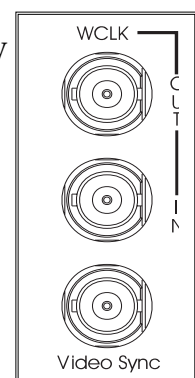
PIN 1	RED
PIN 2	GREEN
PIN 3	BLUE
PIN 4	GND
PIN 5	GND
PIN 6	GND
PIN 7	GND
PIN 8	GND
PIN 10	GND
PIN 11	GND
PIN 12	NC
PIN 13	HSYNC
PIN 14	VSYNC
PIN 15	NC

## A17 VIDEO SYNC - IN

Connector            BNC  
 Input Level            1V p-p 75 Ohms Terminated Internally

## A18 WORD CLOCK - IN

Connector            BNC  
 Input                    Optically Isolated  
 Output Impedence    75 Ohms

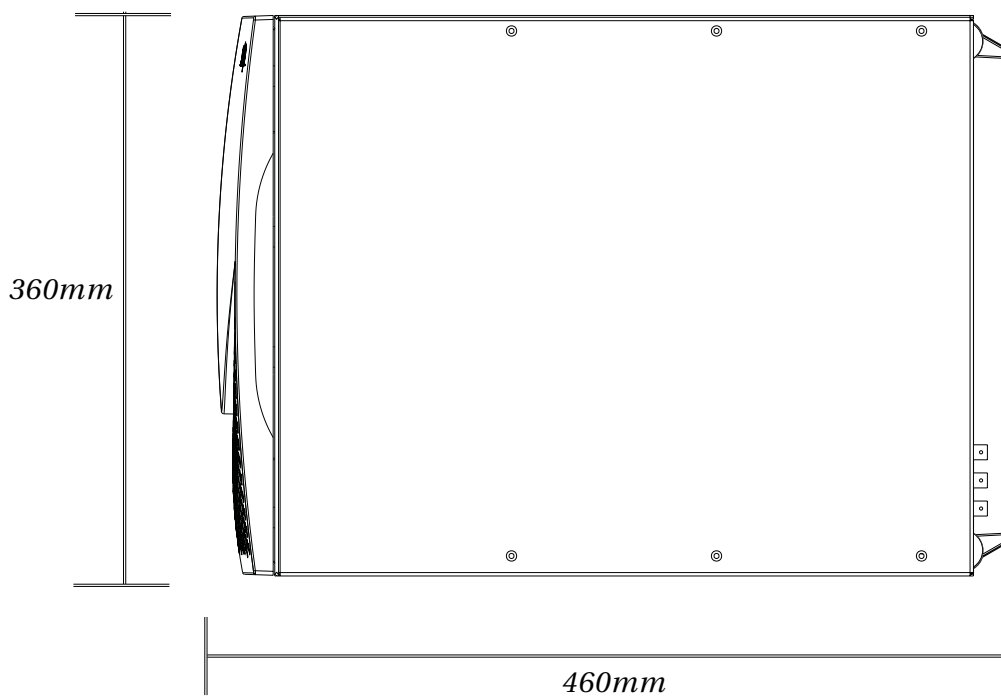
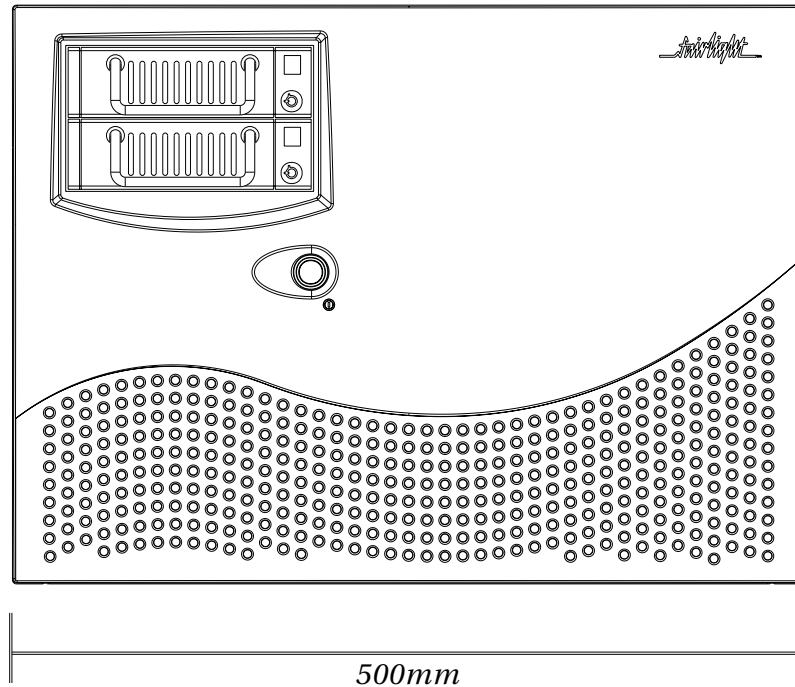


## A19 WORD CLOCK - OUT

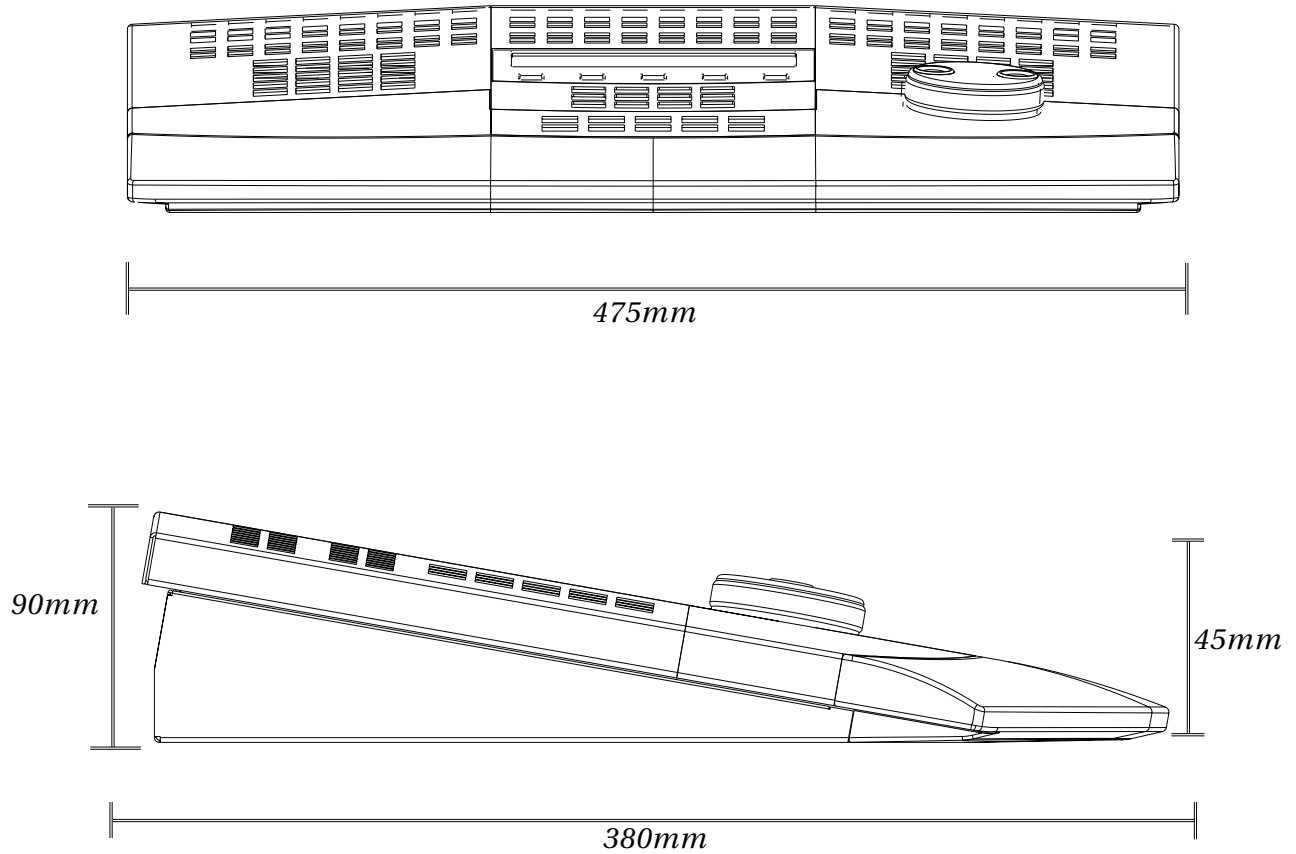
Connector            BNC  
 Output Level            > 4.3V TTL  
 Output Impedence    75 Ohms

## A20 DIMENSIONS

### A20.1 ENGINE



## A20.2 MERLIN CONSOLE



## A20.1 POWER REQUIRMENTS

Input	85-275 Vac
	49-63 Hz 300VA
Fuse	10A - 110V
	6.3A - 240V

*Notes :*